INDIAN AGRICULTURAL
RESEARCH INSTITUTE, NEW DELHI.

I. A. R. I. 6.
MGIPC—S1—6 AR/54—7-7-54—10,000.

JOURNAL

OF THE

ROYAL

STATISTICAL SOCIE

Founded 1834.

Incorporated by Royal Charter 1887.

310977
IARI

Vol. C.—Part I, 1937.

LONDON:
THE ROYAL STATISTICAL SOCIETY
4, PORTUGAL STREET, W.C. 2.

1937.

NOTICE

of the Royal Statistical Society wish it to be under
hat the Society is not responsible for the statements or
ns expressed in the Papers read before the Society or
shed in its *Journal*

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY

PART I, 1937.

THE CONSUMPTION OF STATISTICS.

THE INAUGURAL ADDRESS OF THE PRESIDENT, THE RT. HON. LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C. DELIVERED TO THE ROYAL STATISTICAL SOCIETY ON NOVEMBER 17TH, 1936.

IN all great discoveries there is an element of chance; and there was such an element in my discovery of the subject on which I could address this Royal Society. In my long association with the Ministry of Health I took much interest in the war on Phthisis. I thought I might therefore address you about the statistics of consumption. A second thought showed me that that was a subject for a specialist. But if not the statistics of consumption, why not the consumption of statistics? That did seem a subject appropriate for one who had for long been a member of Parliament and a Minister.

Statistics, like other commodities, have their producers, their middlemen, and their consumers. The producers we know: they are all about us. Our Royal Society is a distinguished middleman in the trade. It is an honest broker between the consumer of statistics and the producer. It tries to help the producer to put sound goods on the market, and to help the consumer to tell between goods sound and unsound.

Who are the consumers? We know at any rate who some of them ought to be. They ought to be all those concerned with the business of government, in theory or in practice, and particularly in practice. But are they?

I am using the word statistics in the widest possible sense of which it is capable, perhaps in a wider, to mean any sort of facts collected and arranged. I will not delay you with any long argument that administrators and legislators ought to consume statistics, in this sense of the word, in their business of legislation and administration. It is obvious that they should. The functions of government which they have to perform have two aspects: that of policy and that of method. They must have a clear idea what they want to do, and how to do it. To know that, they must first learn what the present order is, and for that they must study all the relevant facts, collected and arranged- in other words, statistics. It is all very true and very obvious, and the obvious truth of it is very much neglected. Foresight and preparatory study are not our strong points as a race, and well we know it. Anglo-Saxons have a habit of attracting attention to their own faults by proverbs. The more clearly we recognize a fault, the more proverbs we make about it. We have made more proverbs about foresight in all its aspects than about almost anything else. "Look before you leap," "A stitch in time saves nine;"—the unhatched chickens the house built on the sands, and many another. From that I should deduce that we recognize our lack of foresight more clearly than we recognize almost any other fault. We recognize in particular that this is our weakness in comparison with our neighbours. It is particularly so in comparison with our Latin neighbours. We Anglo-Saxons practical men of action—we leap without looking, and we land often in a pond, a greenhouse, or a midden. Our Latin neighbours are more deliberate. Their fault, if they have one, lies upon the other side. They often look so long that they forget to leap; and sometimes, a characteristic particularly annoying to an Anglo-Saxon, they look so long that they hypnotize themselves into the belief that they have leapt, when in fact they have never done anything but look.

Let us then agree that the study of statistics, in the widest sense of the word, is necessary to the proper conduct of the business of government, and that it is a necessity which we neglect. That may not always have been true, but it is true now. It may not have been true in the days of the Plantagenet monarchy. A government whose problem it was how best to smoke a baron out of his keep, needed to trouble little about tables and curves. A Tudor sovereign, busy with the task of the first organization of a central administration, could still have a mind untroubled by the stern science. I should say that the Golden Age of freedom from statistics began to pass with the passing of the seventeenth century and the coming of the House of Hanover and the interest in bills of mortality. Since then the minds of our governors have been, or should have been, ever more troubled by the need of understanding, through statistics, what the present shape of things is before they can successfully mould it into what they think that it should be.

Certainly the old days were good days in our rough island story, if, as I have supposed, in those days one could act without the painful need for study before action. No true Anglo-Saxon but must lament the way in which the brisk business of mediæval government has in modern times become "all sicklied o'er with the pale cast of thought." We must not be denied a few natural tears over the change; but we must not fail to realize that a change there has been; and that without adequate preparation in study the business of government cannot now be conducted with any certainty. The problems involved are too big and too intricate.

The problems, I say, are too big. There are now very many more people to govern than there used to be, and they are far more governed. For better or for worse the part played by government in the life of every man has been, and is being, largely increased. For better or for worse the individual calls on the state to accept an ever-increasing share of his responsibilities. The influence of the State and its measures on human life and happiness has been, and is being, largely increased. Now that the State has to act as Providence to millions, its mistakes must be as costly in happiness to millions as the mistakes of Providence are wont to be.

Again, the problems of government are too intricate. Let me cite but two, of which, by the force of circumstance, I have had some experience, the problem of currency and the problem of housing.

Consider the case of one who has to regulate a currency. If he is to regulate aright, he must first consume a hearty meal of statistics—statistics of exports and imports, of production, of prices and wages, of bank deposits and rates of interest, and of gold supply. If he neglects to do so, the effect of any action he takes must be fortuitous, and if it is fortuitously wrong he may inflict lethal injury on the economic prosperity of a nation.

Consider housing policy. If one approves of raising housing standards by State action—and even the most conscientious individualist may well approve it—before one can decide how to raise it, one must study building costs, vital statistics, wages, rents, household budgets, interest rates, and the whole field of statistics of public health. So broad should be the foundations of knowledge on which policy, and action in furtherance of policy, are based. Nor are these problems of exceptional intricacy. There are few of the significant problems of modern government that are not at least as intricate. Some are even more so. I may cite as an instance a problem which, oddly enough, remains unsolved even by a National Government—the problem how, without increasing debt, to reduce taxation whilst increasing expenditure.

The problems of modern government are too big and intricate to be solved without study, and particularly the study of statistics. Look to the foundations!—One might think that this is a counsel of perfection, appropriate perhaps to the independent governing class in Plato's Republic, but not appropriate to the dependent, over-driven, and bewildered rulers of a modern democracy. That is a natural, even a humane thought; but we should by all means resist it. Behind that thought there is this other thought that theoretically such statistical studies are good no doubt; but practically government can get along very well without them. Without them our policy and measures may not be theoretically perfect, but they are good enough for practical purposes in the imperfect world in which we live.

It may not be wholly out of place here to ask in passing whether some great teacher, if he were to desire to confer an outstanding benefit on our species, could devote his powers to a higher purpose than persuading us all, once and for all, that the popular idea that theory and practice are contradictory is wholly false. Theory and practice are but different aspects of the same thing and, if both are right, they necessarily affirm each other. It is only if one is wrong that they contradict each other. It is an obvious truism, but it is emphatically denied in the saying, which is the most popular of all sayings with us politicians, that an ounce of practice is worth a ton of theory. It is a mischievous saying, "il gran rifiuto" for a politician. It is a saying responsible for much of the mental lethargy which affects our conduct of affairs.

Indeed, this idea, that political action without study is good enough for the practical world in which we live now, is one that must terrify a citizen of no more than ordinary hardihood. What needs emphasis is that decisions thus made without statistical study, or adequate statistical study, on questions of the magnitude and complexity of those with which modern governments have to deal, are not in the least likely to be even approximately correct. One cannot count on their being good sensible homespun decisions, effective substitutes for their smarter relations—decisions made on an adequate basis of knowledge. The plain truth is that there is not the least reason to expect them to be correct at all. There is no reason to expect that policy thus framed will have any relation at all to the needs of the nation. There is no reason to expect that measures thus designed to further policy will not have an effect opposite to that intended.

When a gunner once in Flanders, I was told by the Staff to destroy an embankment in the enemies' line with gun-fire, that the waters might run out, and leave the land dry for our men to advance over. I destroyed the embankment, and the waters ran in, making advance impossible. The Staff had failed to survey levels. It is a parable of the actions of modern governments made without relation to statistical enquiries. They open their batteries, the waters run the wrong way, and all advance is at an end.

If I were to be sworn as a witness about our methods of government in this country, I should testify that for lack of due preliminary statistical studies, in large measure the relation of policy to needs and of measures to policy are largely a matter of chance. We are little better able now to foretell the effect of our measures than we were when they were based on sympathetic magic and carried out by incantation. In a moment of frankness any Prime Minister of ours might admit without false humility that even now, after so many centuries of civilization, there is still little to distinguish him from a tribal medicine man. His methods have to be the same, and his effects, when he achieves any, are as fortuitous.

A cynic may object that it doesn't matter, if it is so. A modern democracy, he may say, is quite incapable of knowing what it wants, so what does it matter if its government is fortuitous, and if its governors are quite incapable of telling what the democracy is going to get? Few would sympathize with the point of view, and most of us would put the objection differently. A modern democracy, we would say, does know what it wants, however dimly and fitfully it knows it. Oddly enough, what it does not know—however fitfully or dimly—is whether it is getting what it wants or not. The power of mass suggestion is so great nowadays that people believe what they are told to believe, not what is. If the public is told that it is not getting what it wants, it believes it, although it is. If it is told that it is getting what it wants, it believes it, although it is not. The fable of the Emperor's new clothes is a brilliant illustration of the state of mind of a democracy towards its politics, with the difference that when, in democratic politics, the little boy calls out, " Why, he's got nothing on," the democracy smacks his head, and goes on admiring as much as ever the robes that aren't there.

A democracy doesn't know whether it is getting what it wants; but, however dimly, it knows what it does want. Let us concede that it ought to have what it wants. It is a big concession, but we must concede it, unless we are ready with a better political ideal. We must agree, then, that its rulers, unless they are abandoned to cynicism, must not be content to trust to the inability of those they rule to tell whether they are getting what they want or not. Their methods should be of such a nature as to give some certainty—at least some probability—that they will further the desired ends. They should not at any rate be of such a nature as to promote ends exactly contrary to those desired. When the democracy wants more and better houses, for instance, the Government should not subsidize house-building in such a manner as effectively to paralyse the strongest forces in favour of more houses and better ones, as it was doing from 1918 to 1932. Only an abandoned cynic, in short, could be content that government should neglect the study which is needed before action if there is to be any certainty in results, and in particular that it should fail to have a good appetite for the consumption of statistics.

Yet, on the whole, as said, it has not such an appetite: or at least it has it not effectively. I do not say that government does not consume enormous masses of statistics. It does. The trouble is that although it consumes and in a way digests them, there is something wrong with the metabolism. They do not reappear as well-directed energy. The process goes wrong; and if we are to find out why, we must examine the organs of government.

At present the effective organs of our government are in order of importance the press, the wireless, the Civil Service, the Cabinet, the House of Commons, the voters at election time, and the local authorities, with officials and voters after their kind. I know that this classification of the organs of government is not the usual one. I have not time now to defend it: I can only offer it as the result of actual observation, and ask any candid observer to say whether he thinks my classification is far wrong. In particular, I would ask him whether government of our state is not now a partnership between the press and the other sources of mass-suggestion on the one hand, and the regular executive on the other, just as truly and directly as the executive government of our families is a partnership between ourselves and our wives. Of course it has always been so in some measure. But the prodigious development of the technique of publicity in recent years has raised the partnership of the press from a small factor in government to the biggest factor of all. The tribal bard, who was the earliest representative of the press, was a partner very junior to the chieftain. An unbridled press is to-day the senior partner in government, as every modern dictator knows, and as he shows that he knows by making the bridling of the press his first act in establishing himself as sole partner.

If my classification of the organs of a modern democracy may be accepted, at any rate for the occasion, let us look and see if it tells us anything about the reason why it is that, although our government consumes enormous quantities of statistics, it does not succeed in making effective use of the knowledge. Let us see if the organization of our democracy in any way explains the fortuitous character of our policy and our measures.

I believe that it does. But it should be first observed that we must not lay our fault of fortuitousness to the door of lack of the means of knowledge. There is little amiss, I believe, with our collection and interpretation of the statistical knowledge necessary for the practical work of government. By the methods so well known to the members of this Society ample information of the sort is collected and arranged for the use of our rulers. No doubt, not all the particular statistical enquiries are made that should be made as a basis for particular political actions. There has never, for instance, as far as I know, been any effective statistical return of all existing housing accommodation, and that is an essential preliminary to sound housing policy. Lacking such a return, in our overcrowding campaign in particular, we are—if I may so express myself—only browning the covey, not marking our bird. But although such particular enquiries are often neglected, the means of making them are there. The Government has but to ask for them to have them made. The broad basis of knowledge needed to the business of government is there, actually or potentially, in the hands of the Registar-General, of the Civil Service, of this Society, and many other organizations and expert workers. If our political action is fortuitous, it is not for lack of the means of knowledge, but for lack of will or ability to use the means we have.

Is there anything in our democratic political organization as I have described it that accounts for this lack, and, if so, what is it? In our legislation and administration nowadays the course of actual business is that the Civil Service proposes policy and measures, the Cabinet considers them, and then, if it pleases, carries them out, if the press and the public will let it. In doing so it has the help of the House of Commons, or the hindrance, according to its mood. Again, I know that this is not the orthodox theory of the way in which our Constitution works. But again I would ask any candid observer whether he thinks that my description is far wrong.

What is wrong with this process? Why does it fail to secure that policy and measures are based upon the necessary preliminary studies, and so result in so large a measure of fortuitousness in policy and practice? Where does the fault creep in? It certainly does not creep in at the beginning of the process, which is the work of the Civil Service. They are great producers of statistics, and they are also their very hearty consumers. The Civil Service has the will to base the business of government on an adequate foundation of accurate knowledge, and—a most important consideration—it has the time to do so. The business starts well and hopefully with the elaborate and deliberate labours of the Civil Service.

If we look now to the other end of the process—the press and the public—we know of course what to expect, and that is little indeed of belief in the necessity for any scientific studies for practical purposes, and a hearty and very natural dislike of statistical studies in particular. Their attitude towards statistics is expressed by the common saying, "you can prove anything by statistics." We here know what the public means; and we recognize that there is a little truth lurking in the saying. But for a politician, at any rate, it is a truth not nearly so big as its complement, that without statistics you can prove nothing.

The democracy, at any rate, doesn't believe in the need for preliminary scientific studies in practical politics. It prefers slogans. With their help the press solves all problems between 4.30 p.m. and 1 a.m., and solves them afresh daily without for the most part troubling to recall how it solved them the day before. The public, with the help of the press, solves them daily between 8.30 and 9.30 a.m. That is all the time and attention they have to give. It is too much to expect these partners in the business of government to be consumers of statistics, or to realize the necessity for their consumption. So at one end of the process of government we have careful study of the statistical basis of policy and practice; at the other we have great indifference to it. What happens in the intermediate stages of the process, and those are the stages of proceedings in Parliament and the Cabinet?

What happens in Parliament is in fact of very little consequence, because with the growth of the Cabinet system Parliament has ceased to take much constructive part in the business of government. I know that it is not good constitutional form to say so; but it is substantially true. The influence of Parliament is now not constructive, but inhibitive. It prevents the constructive partners in the Government, the press, the Cabinet and the Civil Service, from doing many things which they would do, if Parliament were not there. But it is no longer an originating force, and has hardly been so since the Revolution. Nine-tenths of the practical business of legislation, as well as that of administration, is done by the Cabinet and the Civil Service. Parliament now no longer initiates much: and even the work of amendment and revision which occupies so much of its time is largely nugatory.

If Parliament counts for little in our enquiry we have only one direction left in which to look, and that is the Cabinet. It seems that it is to the Cabinet that we must turn to understand why our policy and practice are fortuitous. On the one side is the deliberate and scientific work of the Civil Service. On the other is the indifference to science and deliberation of the press and the public. If the scale, as far as results are concerned, tips decidedly over to the popular side of haphazard, it seems as if it must be the Cabinet's fault. I am speaking, of course, of the Cabinet as an institution;

not of any Cabinet in particular. The Cabinet it is that should act as interpreter between the instructed experts and the uninstructed public. If there is to be any certainty in the results of government, it is the Cabinet that must persuade the democracy at least to accept the result of others' studies, although the democracy is unable or unwilling to make the necessary studies itself. If, on the whole, there is no certainty in the results of government, it must be because on the whole the Cabinet fails in this function. On the whole I think it does fail in the essential function of acting as a go-between between the professional and instructed administrators and legislators of the Civil Service, and other experts, and the amateur and uninstructed public. It commonly follows the lead of the amateurs about all big things and accepts that of the professionals about details only.

If we are right in running this defect to earth in a spot so inaccessible as the Cabinet-room, it is clear that it is not going to be easy to find a remedy. There was a time when one thought that the remedy was to be found in giving the Cabinet a better and bigger professional staff. That was first suggested to me by my experience of the organization of the Navy in the War. As a new-comer to the great service, I was naturally interested to study its organization. The first difficulty was to find, as it were, the brain of the organism. I may say that I found important nervous ganglia at the Admiralty, at Portsmouth, and elsewhere; but I could never find anything analogous to the mammalian brain. However, the organism flourished in spite of that, except for one grave defect. The results of central research were not put effectively at the disposal of the men at sea. It was a defect something like that which we have now noticed in our central Government, with its gulf between the Cabinet and the experts. Later on in the War, special officers were appointed to make connection between the quarter-deck and the centres of staff-work and research, and the defect was remedied. Remembering that in later days, I thought that perhaps what is needed in the machinery of government is a similar staff to make liaison between the Cabinet, the research workers, the statisticians and other experts, and the professionals of the Civil Service. But the hope that so easy and simple a remedy might suffice to introduce reason and foresight into the government of a democracy does not survive the test of experience. In fact, experiment after experiment has been made with staff organs of the sort, to serve and to stimulate the Cabinet and the nerve-centres of the executive in Downing Street. Apart from the growth of a Cabinet Office, we remember the Development Commission, and now there is the Economic Advisory Committee, and the Department of Scientific and Industrial Research. I do not wish to belittle the faithful labours of these bodies, and those of the last-named in particular. They are of much value to the public. But they come and they go, and, while here, they have little direct influence on affairs, and for the Cabinet in particular they have no significance at all. It is no use trying to introduce such organs into our system. They soon atrophy, as the Development Commission has atrophied; and the reason is, that the Cabinet has no inclination to attend to them, and had it the inclination it would not have the time.

Of course the Cabinet cannot have time to make itself at first hand the study of statistics necessary to make government other than fortuitous. Twenty over-worked gentlemen, ceaselessly preoccupied with the art of government, which in a democracy is the art of keeping afloat on the ever-fluctuating waves of public opinion, these cannot give much of their minds to the science of government as distinguished from its art. But experience teaches us that it is more than lack of time that makes the Cabinet prefer the art of government to its science. It is lack of inclination. It is lack of inclination that makes it refuse so heartily and consistently to consume the meals of statistics that are put before it by the experts and the Civil Service. And why is that? Need we ask? It is for the obvious reason that in a democracy the Cabinet are the servants of the public and partners of the press, and neither press nor public cares much about scientific government.

It seems that this modest enquiry of ours has turned out to be an enquiry into the non-consumption of statistics in high places, its cause and cure, and we seem to have come to an end of it. We have got to the conclusion, which from the outset has been visible close ahead, that if for the lack of a due consumption our government is largely fortuitous, it is because we are a democracy, in which press and public call the tune, and the tune that they call is not a statistical tune. How, then, are we to secure more certainty in government, based on study of facts? What is the remedy for our fortuitousness? Each must bear his testimony. Mine must be that, with a democracy of the sort which we have, based on universal suffrage, an omnicompetent elected legislature, and an executive responsible to parliament, there is absolutely no remedy at all. If this is the government we prefer, we must be content to do without the effective consumption of statistics. We must be content to have no certainty that our policy will be related to our needs, or that our measures will further our policy. There is no remedy at all, consistent with our accepted ideas of democracy. To find a remedy the democracy must be prepared to pass a self-denying ordinance of wide scope, entrust larger powers of government, executive and legislative, to unrepresentative persons, stand back itself and agree not to interfere, and give the rulers the security of tenure necessary to make the agreement effective. The sovereign people, in short, must take a leaf out of the book of the sovereign monarch, and be content to reign but not to rule. But that would not be remedying a defect in our present system: it would be replacing our present system by a new one.

I am disposed to say to myself, " Was ever so absurd a reason given for questioning our blessed constitution as this of mine, that a democracy does not pay enough attention to statistics?" It sounds absurd, I agree, but I wonder if it is. Let us remember that our institutions were developed to fit a much less complex state. They were developed before the Great War had taught us the degree to which national organization can be carried. They were not developed to compete with the modern totalitarian state. They were developed when the science of government, and its ancillary science, the science of statistics, were less developed than they are now. They were developed, in short, at a time when fortuitousness in government, and the mistakes which accompany it, could not bring the overwhelming disasters and miseries which now they can bring. It may, then, not be wholly absurd to ask whether we ought not to introduce some certainty into our methods for the avoidance of those disasters and miseries, even at the cost of change in cherished but outworn institutions. If that be not absurd, I am sure that it is not absurd to take a greater readiness to consume statistics as a symbol, as it were, of the changes needed to save us from those miseries and disasters.

It is very sober truth that under modern conditions at home and abroad with the State invading the whole sphere of human life, humanity cannot get on without the statistician, to tell it how things stand, and what the effect of its political actions will be. When our thoughts turn to questions of national survival, we may remember the beatitude " blessed are the meek, for they shall inherit the earth" and remember at the same time that statisticians are the meekest of mankind.

PROCEEDINGS OF THE MEETING.

PROFESSOR GREENWOOD: Five months ago, Sir Josiah Stamp applied to the past Presidents of the Society Disraeli's characterization of his political opponents—extinct volcanoes. With respect both to Sir Josiah Stamp and myself, the metaphor is inappropriate. I freely recognize Sir Josiah Stamp's massive and shining qualities can properly be typified by a mountain of fire, but one before whom even Sir John Reith must appear can hardly be described as *extinct*.

In my own case, recalling Piscator's admonition "Thou canst not lose what thou never hadst," I am sure that I am not an extinct *volcano*; perhaps a burnt squib might be suggested as a suitable amendment. But even squibs have their value. A future President of this Society, now resident at Cambridge as a Junior member of the University, has been much cheered up by squibs recently, at the small cost of a contribution of ten shillings to the Borough funds, and that is a very small sum to pay for a contribution to the great cause of cheering us all up.

As I am not allowed, even if I wished to do so—which I do not—to criticize the President's address, I should like to try to make a small contribution to the cause of cheering the President up, because I cannot help detecting a touch of melancholy in the general tenor of his address. The usual way of consoling anybody and cheering him up, is to point out to him that the people he admires are not quite so good, and the people he condemns are not quite so bad as he thinks. God forbid that I should suggest that statisticians and salt of the earth are not exact synonyms: of course they are. But it is possible that one of the reasons why statistical salt does not savour the whole political earth is inherent in human nature, and not a particular vice of modern democracy. A man of some parts who watched the ancient democracy on its death-bed, and lived nearly two thousand years before the birth of modern democracy, thought that the defect our President has pointed out was psychologically determined. Aristotle said, "Even when reason gives a command and understanding bids us either avoid or pursue something, the individual is not moved accordingly, but follows the direction of appetite. So also in general, we see that the man who understands the art of healing does not on that account therefore heal, a fact which shows that it requires something beside knowledge to produce the results of knowledge: and that scientific knowledge is itself unable to effect this end." If Aristotle was right—and I suggest that he *was* right—the gulf between *episteme* and *poiein* is psychological, existed before the printing press, and will exist if and when the many-headed tyrant is replaced by one tyrant.

But our President is discouraged by the blatant folly of the many-headed tyrant. Perhaps a dose of my favourite physician, Walter Bagehot, may cheer him up. "If you will only write a description of it, any form of government will seem ridiculous. What is more absurd than a despotism, even at its best? A king of ability or an able minister sits in an orderly room, filled with memorials, and returns, and documents and memoranda. These are his world; among these he of necessity lives and moves. Yet how little of the real life of the nation he governs can be represented in an official form! How much of real suffering is there that statistics can never tell! How much of obvious good is there that no memorandum to a minister will ever mention! How much deception is there in what such documents contain! How monstrous must be the ignorance of the closet statesman after all his life of labour, of much that a ploughman could tell him of! A free government is almost worse, as it must read in a written delineation. Instead of the real attention of a laborious and anxious statesman, we have now the shifting caprices of a popular assembly—elected for one object, deciding on another; changing with the turn of debate; shifting in its very composition; one set of men coming down to vote to-day, to-morrow another and often unlike set, most of them eager for the dinner-hour, actuated by unseen influences, by a respect for their constituents, by the dread of an attorney in a far-off borough. What people are these to control a nation's destinies, and wield the power of an empire, and regulate the happiness of millions! Either way we are at fault. Free government seems an absurdity and despotism is so too."

Bagehot, as we all know, explained the relative success of the system of his time by the deferential character of the English people. I will return to that point in a moment. Another mitigation of the system is the vast inattention of the governing class, whether press lords or electors. Our President, who has been concerned in great affairs, may be inclined to overlook small affairs; but in the aggregate small affairs are very important. I have been told that the aggregate amount of parliamentary time, taking account of committees, devoted to politically non-contentious business, exceeds the time devoted to burning questions which have publicity value. Add the volume of public business which never flows through the High Court of Parliament at all, and we reach an influence for good or evil which may exceed the spectacular, the dramatic side of politics. That in these —to the general reader—wholly uninteresting matters, the utilization of exact statistical information is far greater than even twenty-five years ago, is within my own knowledge. It would be easy, but tedious—for even we statisticians are not all interested in all statistics (as the varying sizes of our audiences at our monthly meetings show) —to cite instances; it is unnecessary, we all know them. Fortunately, many important topics have no news value whatever. In considering some of them, our President will find much consolation for the blundering incompetence with which spectacular topics are often handled by Ministers, journalists and the man in the street. But if the President were to retort that, let us say, a correct judgment upon how to prevent diphtheria spreading in a boarding-school, or even a hundred boarding-schools, is an inadequate set off to a false judgment which sends one hundred thousand men to death or mutilation—I can only bow my head.

Yet even here, there is room for consolation; in the sense that our statesmen are not less but more accessible to men of science than in the past. I return to Bagehot's point on the psychology of our people. We *are* a deferential people; we do believe that statesmen should have followed a particular course of education for their business—a course of vocational training. Once upon a time Eton and Kings or Christ Church, and a seat in Parliament at latest by the age of twenty-six, were considered admirable seasoning for Cabinet wood, and they still command approval in both the right and the left wing of our politics. The Prime Minister is of Harrow and Trinity, Cambridge. The Leader of the Opposition is of Haileybury and University College, Oxford. Either the Prime Minister or the

Leader of the Opposition would have been ruthlessly ploughed had either attempted the paper on Statistical Methods set by a Fellow of the Society, now present, for the Civil Service Competition last year. That is the present position. Fifty years ago both the Prime Minister and the Leader of the Opposition were of Eton and Christ Church. The Prime Ministers of fifty years ago and now, the leaders of the Opposition of fifty years ago and now, all four have this in common, that not one of them has or had the faintest idea of the meaning of a "probable error" and not one of them could have told you whether the Bernoullis were a music hall troupe or a tribe of Red Indians.

The more recently introduced qualifying course for statesmanship via Urban District Councils and the Offices of Trades Unions has not made any essential difference. To have read Aristotle's Politics is quite consistent with a total ignorance of scientific method, but not to have read Aristotle's Politics does not guarantee a knowledge of scientific method. As the President has pointed out, we compensate for the habit of leaping without looking, by making admirable proverbs on the need for foresight. We also hold that no person who has proved himself a competent looker should ever be allowed to leap at all. The combination of scientific and administrative ability in one individual is assumed to be a contradiction in terms.

Not long ago, some of us here attended a course of lectures on mathematical statistics by a Parisian colleague who was a professor and a membre de l'Institut. This colleague had also been a Cabinet Minister; indeed, a membre de l'Institut, also a mathematician, has been Prime Minister of France. We, of course, frequently—indeed usually, make Prime Ministers Fellows of the Royal Society, but the thought of making Fellows of the Royal Society Prime, or even minor Ministers, would strike with horror a rigidly conservative body such as the Labour Party, and excite good-natured merriment even in a less rigid body like the Conservative Party. This may be all wrong, perhaps it is all wrong, but it is just as fixed and certain a feature of English life as bacon and eggs for breakfast. Those British men of science who sneer at this custom and revile party politics, are not really being scientific, because the habit of science is to recognize the facts of existence: they are only behaving like children beating the naughty table, and would be better employed in using the power that they *do* possess of influencing the statesmen class. The men who have what the British press and public regard as indispensable qualifications for Cabinet rank are increasingly more willing to listen to what scientific men have to say, on the understanding that if their advice leads to popular success, all the credit shall be given to the statesman; if on the other hand it proves to be unpopular, all the blame shall be thrown on the foolish experts. The proper rôle, the inevitable rôle of a scientific man in the government of this country is that of the confidential, faithful waiting maid to the princess, a post to which the duties of a whipping boy may be attached, without extra wages. This Society has been a perfect registry office of confidential maids to fairy princesses—in fact, the fairy princesses come in person to the registry office every two years or so. I must admit that in the past our visiting princesses have been—how shall I say it?—a trifle mature, not quite so young as they were, but to-day we are starting a new era. We have welcomed a very large number of Presidents who have served their country in high political office. To-day we welcome a President whose service to his country is in the future as well as in the past. We know from his address that he does not undervalue what we have to teach him. Perhaps we may repay his kindness in some measure by bringing to his notice some of the little things that a statesman may overlook, and our reward will be to see him continuing to render the State not *some*, but *great* service.

I have great pleasure in moving a cordial Vote of Thanks to our President.

Sir Josiah Stamp: I can assure you I have no intention in seconding this vote of thanks of joining issue with the proposer on any question of physical geography, or the analogies of volcanoes. It may not have been an exact one on my part, but at any rate, modest as he is in thinking of himself in these terms, we shall always associate him with them, for there are always within him the murmurings of scarcely controllable internal forces, and with his capacity for burying whole controversialists under glowing lava, and his sometimes sulphurous humour, I think he ranks very well for candidature in the volcano line. I do not wish to stress the point—he seems to prefer some more simple and pastoral rôle, and I am willing to place myself under the Greenwood tree.

I shall pass by those tactless references to squibs, for Professor Greenwood would have made a grand surgeon in the pre-anæsthetic days. But I come to my business, the seconding of this vote to our new President for his most interesting address. We must not be deceived by his humorous or facetious handling of parts of it, for behind it he has engaged in a serious game of hunt-the-slipper: he goes round, as it were, looking for the spot where the current has failed in the transmission of exact power in precise knowledge, between its source and final democratic action. What are we to do about it?

I agree with the proposer that he wished to make our flesh creep, and he probably was less pessimistic and agnostic on the subject than he would have us believe. It would be very difficult for us to refute his case; he has been inside, and he knows, and that is where he has the advantage of us. If the failure is at a particular point in the Cabinet or amongst the Ministers, if it is a case of inclination, and not of time, he ought to know, and it is very difficult for us to do other than bring illustrations of our own experience which tend rather to support his theory than to refute it. We have had in our ranks most eminent statesmen—Gladstone included—and we have had men of statistics, like Sidney Webb and Herbert Samuel, as ministers and even our present President has had opportunities of showing his statistical prowess in the past. Perhaps it is one alone against so many that has made him a little sore in reminiscence. While we can mention certain illustrious statesmen who have liked exact information, our minds go perhaps to certain other statesmen who liked their statistics in the impressionistic way. I remember one who was very illustrious and very well known, who had a passion for statistics, and

THE CONSTRUCTION OF AN INDEX OF BUSINESS ACTIVITY.

By E. C. RHODES, D.Sc.

[Read before the ROYAL STATISTICAL SOCIETY, Tuesday, December 15th, 1936, the PRESIDENT, the RT. HON. LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C., in the Chair.]

1. NOWADAYS there is an abundance of statistical data, relating to the economic activity of the community, which is regularly presented in a fairly digestible form for consumption by those whose palates have this acquired taste. In the *Labour Gazette* there are shown at regular intervals graphs indicating the course of Prices, Wages, Employment, Production and Trade, and Finance. Similar data are available in the bulletins of the London and Cambridge Economic Service. The *Economist* newspaper has also for years rendered a like service to the business community. In each case, the data are presented as indicative of various aspects of the economic activity of the community as a whole, and it is left to the reader to integrate these and get some conception of the changes that have been taking place in recent times in the economic life of the country. Since October 1933, the *Economist* has reduced this mass of data to a still more digestible form; a pill in the shape of an "Index of Business Activity" is now on the market. The integrating process formerly left to the reader is now performed by the newspaper itself, and all the patient has to do is to swallow the pill. Mr. Geoffrey Crowther, in this *Journal*, 1934, p. 241, described the process of manufacture of the pill, explaining how these constituent data are integrated. I propose a re-examination of this problem of the method of combining into one series the various data which are generally used to indicate the changes in the economic life of the community.

The *Economist* Index "has been widely accepted as a measuring rod of Britain's Economic Activity" (*Economist Trade Supplement*, July 25, 1936). The Index is therefore measuring some abstraction called Economic or Business Activity. Mr. Crowther, in his paper referred to above, says that the object is "to say just how active or inactive the community is at any moment." So, mere Indices of Production are not sufficient, the Index should also include amongst its constituents data relating to Distribution and Services, hence the inclusion of Railway, Motor, Postal, Financial figures. The presumption is that there exists some general factor, referred to vaguely as the general trend in economic affairs, which is reflected in concrete data of Employment, Coal Output, Postal Receipts, Metropolitan Clearings and the like. In practice, no one series is put forward as the sole indicator of this general factor. on the grounds that it will not give a perfect reflection: there is some distortion. Besides being influenced by the general factor, "Business Activity," each statistical series, which is presented as a reflection, emerges as the resultant of this factor combined with others. For instance, the state of Employment is not a perfect guide to Business Activity, because it is also influenced by other factors, such as the changes in technique of manufacture or of business methods.

2. We therefore assume that each statistical series which is considered to reflect changes in the economic life of the community is the resultant of a number of factors, a common factor, Business Activity, and a variety of others. Of these other factors, some of them may be common causes in a select group of the statistical series. For instance, we may argue that special influences would affect both the Consumption of Electricity and the Output of Coal and would not affect Metropolitan Bank Clearings. On the other hand, some of these other factors may be considered to influence only an individual series. The special conditions peculiar to the Coal-Mining Industry may cause movements from time to time in the Output of Coal, and would not cause similar movements in others of the series.

We therefore assume that each statistical series may be considered as a function of a Common Factor, Group Factors affecting two or more of the series, and Special Factors.

3. In the simplest algebraical terms this assumption may be stated in the form,*

$$X_t = r_x I_t + g_x G_t + X_t',$$

where X_t represents the member of the series at time t, I_t, G_t, X_t' stand for the values at that time due to the influence of the Common Factor, the Group Factors, and the Special Factors. Thus a number of statistical series may be represented as follows :—

$$\begin{aligned} X_t &= r_x I_t + g_x G_t + X_t' \\ Y_t &= r_y I_t + g_y G_t + Y_t' \\ Z_t &= r_z I_t + Z_t' \\ U_t &= r_u I_t - h_u H_t + U_t' \\ V_t &= r_v I_t + h_v H_t + V_t'. \end{aligned}$$

Here the item I_t is included in all, representing the common element.

---

* This eventually leads to a weighted arithmetic average. We might have taken a different expression which would lead to a weighted geometric average. But the general conclusions of this paper would not be greatly affected by such a change.

But, owing to this common element being transformed into different standards and units and relative bases, the factors r_x, r_y, r_z, r_u, r_v are introduced in these expressions. The series X and Y are supposed to be subject, in addition, to group factors peculiar to these two. This is indicated by the item G_t, which again is given multipliers, g_x, g_y, to allow for the possibility of X and Y being measured in different ways. Similarly U and V are supposed to be affected by another set of factors common to these two series, so the item H_t is introduced. Finally, each of the right-hand sides has a residual item X_t', Y_t', Z_t', U_t', V_t' which represents the contribution to the series from the special factors, independent of one another, which influence the series individually.

4. In what follows, we will take it for granted that each of our statistical series consists of Index Numbers on the same period as base, as in the case of the constituent series of the *Economist* Index of Business Activity. In this case I_t stands for the Index of Business Activity, the influence of the Common Factor, and X_t stands for one of the constituent series, *e.g.* the Index of Employment. [The *Economist* Index was originally based on the year 1924. Recently (July 25 1936) the base was changed to 1935.]

5. If the members of the various series for a given time t, are averaged in any way, *e.g.* by using a weighted average, the result is supposed to give I_t, the other components having balanced out to zero in the course of the averaging process. In the case of the *Economist* Index of Business Activity, this idea is put into operation. A weighted average is found, and the result gives the required Index. (The *Economist* Index is now a Geometric Average.) The weights which are used are determined by considerations of the relative importance of the different constituent series. Mr. Geoffrey Crowther, in this *Journal*, 1934, pp. 254–5, on this question of weighting, says: "In allotting these weights, several considerations were taken into account. The first was, of course, the size of the industry, where any particular industry was referred to. . . . Secondly, some indices, which on mere considerations of size would receive small weights, were given heavier weights in view of their excellence as indicators of activity in other lines: Postal Receipts is the outstanding example. Thirdly, some indices were given reduced weightings because they are expanding industries and to some extent untypical (*e.g.* Motor Vehicle Registrations). Fourthly, indices which are subject to sudden distortion by temporary factors were given reduced weights: the distortion of London Bank Clearings by the War Loan Conversion scheme is a case in point. Fifthly, several indices, notably Iron and Steel Consumption and Cotton Consumption, were reduced in weight owing to their inherent tendency to violent fluctuations.

Lastly, any index which was less satisfactory than the rest as a measure of what it purported to be was reduced in weight: for example, Motor Vehicle Registrations is only an indirect measure either of motor transport in general or of automobile production."

6. It will be seen, from the above quotation, that a great deal of thought was given to this question of proper weighting. The question was settled by general considerations as to the relative values of the constituent items, not thinking of these as mere numbers, but as descriptions of phases of the economy of the community, *e.g.* as Employment, Cotton Consumption, Bank Clearings, etc., not 121·3, 108·4, 109·6, etc. Thus, we may say that considerations extraneous to the statistical series themselves were used to determine the method of combining these series, *i.e.* the weighting.

7. How far is it possible to use the series themselves to give us indications of the correctness of this decision? Can we, from internal evidence, deduce, for instance, that the *Economist* is right in considering that Motor Vehicle Registrations being only an indirect measure either of motor transport or of automobile production, should have its weight reduced because it is less satisfactory than the rest as a measure of what it purported to be. (See above.) If this particular index is less satisfactory, then in the course of time this truth will out in the figures themselves, and a statistician can detect it. Is it possible to discover if some of the principles on which the weighting system used was based are wrong principles? Mr. Crowther says, in the same place, " any distribution of weights must necessarily be arbitrary and a matter of guess-work." He confesses that scientific calculation was out of the question. Can we discover, from the data themselves, how far the guess-work was right? Can we use some scientific calculations, now that data are available, to settle some of our doubts. I think we can.

8. If we take our assumptions as to the constitution of one of the statistical series in the simplest form $X_t = r\,I_t - X_t'$, *i.e.* ignoring the possibility of group factors, and consider such a series over a period of time, changing t from 1 to n, we may work out an average $\bar{X}_t = r_x\bar{I}_t + \bar{X}_t'$, r_x being the same over the period. The deviations from this average may be written $x_t = r_x i_t - x_t'$. Similarly, another series will give $y_t = r_y i_t - y_t'$. We may thus obtain two simple equalities :—

$$S(x_t^2) = r_x^2 S(i_t^2) + S(x_t'^2) + 2r_x S(i_t x_t'),$$
$$S(x_t y_t) = r_x r_y S(i_t^2) + r_x S(i_t y_t') + r_y S(i_t x_t') - S(x_t' y_t'):$$

where the summations range over the chosen period, t from 1 to n. Our assumptions as to the independence of the factors which contribute to the elements X_t' and Y_t' in our original expressions imply that all such totals as $S(x_t'y_t')$, $S(i_tx_t')$, $S(i_ty_t')$ are zero. Consequently, the relations above may be written as

$$S(x_t^2) = r_x^2 S(i_t^2) + S(x_t'^2),$$
$$S(x_t y_t) = r_x r_y S(i_t^2).$$

9. Suppose we took account of four series X, Y, Z, U, then we should have the following equations, dropping the suffix (t),

$$S(xy) = r_x r_y S(i^2), \quad S(xz) = r_x r_z S(i^2), \quad S(xu) = r_x r_u S(i^2),$$
$$S(yz) = r_y r_z S(i^2), \quad S(yu) = r_y r_u S(i^2), \quad S(zu) = r_z r_u S(i^2).$$

Here are six equations from which to obtain four *desiderata*, which for convenience are taken as R_x, R_y, R_z, R_u, where $R_x = r_x\sqrt{S(i^2)}$, etc. The equations are :—

$$R_xR_y = S(xy), \quad R_xR_z = S(xz), \quad R_xR_u = S(xu),$$
$$R_yR_z = S(yz), \quad R_yR_u = S(yu), \quad R_zR_u = S(zu).$$

There are two more equations than are needful, but as the amounts $S(x'y')$, $S(ix')$, etc., which are assumed to be exactly zero will not in practice disappear completely, we use all six equations in order to estimate values of the R's which satisfy these equations approximately. This can be done, for instance, by taking $\log R_x + \log R_y = \log S(xy)$, etc., as our equations, and using the Method of Least Squares in order to arrive at values for $\log R_x$, etc.

10. The values of R_x, R_y, etc., thus obtained may be used in equations $S(x^2) = R_x^2 + S(x'^2)$, etc., to give us values of $S(x'^2)$, etc. Thus, we may be considered to have split up, at any rate approximately, the values $S(x^2)$, etc., into two components, the one, R^2, arising from the common element in all such expressions, the other being the residual due to the special factors independently influencing each one of $S(x^2)$, $S(y^2)$, $S(z^2)$ and $S(u^2)$. These results may be used in order to obtain the value of i for a particular period t in the following manner.

11. If, over a period of time, we may regard each value of x_t' as belonging to a system of residuals distributed normally with standard deviation σ_x, then we may express the chance of getting such a residual between the limits x_t' and $x_t' + dx_t'$ as

$$\frac{1}{\sqrt{2\pi}\,.\,\sigma_x} e^{-\frac{1}{2}x_t'^2/\sigma_x^2}\,.\,dx_t'.$$

The combined chance of residuals x_t', y_t', z_t', u_t' is proportional to

$$e^{-\frac{1}{2}(x_t'^2/\sigma_x^2 - y_t'^2/\sigma_y^2 - z_t'^2/\sigma_z^2 - u_t'^2/\sigma_u^2)}$$

The exponent of this expression may be written as

$$-\tfrac{1}{2}\left(\frac{(x_t - r_x i_t)^2}{\sigma_x^2} + \frac{(y_t - r_y i_t)^2}{\sigma_y^2} + \dots + \dots\right).$$

If we wish to estimate the most likely value of i_t to be obtained from given values x_t, y_t, . . ., we maximize this chance, and obtain

$$i_t = \frac{x_t \frac{r_x}{\sigma_x^2} + y_t \frac{r_y}{\sigma_y^2} + \ldots + \ldots}{\frac{r_x^2}{\sigma_x^2} + \frac{r_y^2}{\sigma_y^2} + \ldots + \ldots}$$

Now, we may consider that an approximation to σ_x^2 is given by $\sigma_x^2 = \frac{S(x'^2)}{n}$, with similar expressions for the other standard deviations. So, this equation may be written,

$$\frac{i_t}{\sqrt{S(i^2)}} = \frac{x_t \frac{R_x}{S(x'^2)} + y_t \frac{R_y}{S(y'^2)} + \ldots + \ldots}{\frac{R_x^2}{S(x'^2)} + \frac{R_y^2}{S(y'^2)} + \ldots + \ldots}$$

Consequently, if we use weights for x, y, z, u proportional to $R_x/S(x'^2)$, $R_y/S(y'^2)$, . . ., substituting in these the approximate values of the R's and $S(x'^2)$, $S(y'^2)$, . . . obtained as described above, we shall obtain a series of figures proportional to the i's for all the periods. In other words, we have here a system of weights with which to combine our series in order to get the desired index, these weights being derived from the series themselves. Of course, we realize that these weights should only be regarded as approximations and we now have to consider the next stage, how to improve our estimations.

12. We will suppose that we have now obtained a series of figures proportional to the i's, approximately. We may now calculate $S(i^2)$, $S(ix)$, $S(iy)$, $S(iz)$, $S(iu)$, using this new series. But, $i_t x_t = r_x i_t^2 + i_t x_t'$, and summing gives $S(ix) = r_x S(i^2) = R_x \sqrt{S(i^2)}$, neglecting again $S(i_t x_t')$. Thus we may get a new estimate of R_x from $\frac{S(ix)}{\sqrt{S(i^2)}}$, using these new calculations. Similarly with the other R's.

The new estimates of the R's will give better values for $S(x'^2)$, $S(y'^2)$, etc. Hence we get a better system of weights and better values for the i's.

13. Moreover, at any stage in this process, when we have computed a series of values of i we can compute $r_x i_t$ for each period. Actually if we use the weights in our calculations to give figures proportional to the i's we shall have a series λi_t, where λ is an unknown multiplier. From these we can get $\lambda \sqrt{S(i^2)}$.

Now $$r_x i_t = R_x \frac{i_t}{\sqrt{S(i^2)}} = R_x \frac{\lambda i_t}{\lambda \sqrt{S(i^2)}}.$$

So, in practice, we need not bother with the real values of i at all.*

14. If we subtract each $r_x i_t$ thus obtained from the original x's, we shall get the individual residuals (x_t') for each period. Similarly we can get the y_t''s and so on. These residuals may be used to give us $S(x'^2)$ which we can compare with the approximate value previously obtained through our equations. Also we can get $S(x'y')$ from the residuals, and thus test whether our original assumption of this being negligible is a reasonable one or not. This value must be compared with $\sqrt{S(x'^2)}$, and $\sqrt{S(y'^2)}$. We can use the correlation coefficient $r_{x'y'}$ for this purpose. If this is sufficiently small to be considered negligible we may regard our original assumption as being justified. On the other hand, if this appears to be so large that x' and y' are not to be regarded as independent, then we must modify our original assumptions and introduce into our analysis the possibility of the existence of Group Factors.

15. As an illustration of the foregoing method, let us take the monthly indices for the period July 1931–June 1935, given in the *Economist* (Trade Supplements, June 29, 1935, and Oct. 26, 1935), of Employment (X), Consumption of Electricity (Y), Commercial Motor Vehicles in use (Z), Building Activity (U), as our four statistical series. After averaging these series, each containing 48 indices, we get the deviations from these averages, x, y, z, u. Then we have

$$S(xy) = 3{,}331,\quad S(xz) = 1.818,\quad S(xu) = 5{,}900,$$
$$S(yz) = 8{,}877.\quad S(yu) = 28{,}248,\quad S(zu) = 15{,}668,$$
$$S(x^2) = 735,\quad S(y^2) = 16{,}945,\quad S(z^2) = 5{,}019,\quad S(u^2) = 51{,}627.$$

The equations from which the R's are to be estimated are therefore :—

$$R_x R_y = 3.331,\quad R_x R_z = 1.818,\quad R_x R_u = 5{,}900,$$
$$R_y R_z = 8.877.\quad R_y R_u = 28.248,\quad R_z R_u = 15.668 \text{ (see para. 9).}$$

The values of R obtained by taking logarithms and using the Method of Least Squares are :—

$$R_x = 26{\cdot}22,\qquad R_y = 126{\cdot}8,\qquad R_z = 69{\cdot}76,\qquad R_u = 224{\cdot}1.$$

From these we obtain :—

$$R_x^2 = 688,\qquad R_y^2 = 16{,}071,\quad R_z^2 = 4{,}866,\qquad R_u^2 = 50{,}242.$$

These, being subtracted from $S(x^2)$, $S(y^2)$, etc., give :—

$$S(x'^2) = 47{\cdot}1,\quad S(y'^2) = 874,\quad S(z'^2) = 154,\quad S(u'^2) = 1{,}386.$$

[In the original computations the values of $S(xy)$, etc., $S(x^2)$, etc., were taken to 2 places of decimals, and all the figures quoted here have been reduced to reasonable dimensions.] A comparison between such products as R_rR_y and $S(xy)$ is given below :—

---

* Actually, i_t is indeterminate. We can only find $\frac{i_t}{\sqrt{S(i_t^2)}}$. "Business Activity" is an unmeasurable abstraction.

$S(xy)$	3,331	$S(xz)$	1,818	$S(xu)$	5,900	$S(yz)$	8,877	$S(yu)$	28,247	$S(zu)$	15,668
R_xR_y	3,324	R_xR_z	1,829	R_xR_u	5,877	R_yR_z	8,931	R_yR_u	28,415	R_zR_u	15,700
Diff.	+7		−11		−23		−54		−168		−32
Correlation	−·034		−·127		−·089		−·094		−·152		−·070

The correlation coefficients in the above table are of this kind :—

$$r_{x'y'} = \frac{S(xy) - Rxy}{\sqrt{S(x'^2)}\sqrt{S(y'^2)}} = \frac{+7}{\sqrt{47\cdot 1}\sqrt{874}} = -\cdot 034.$$

16. It would appear then that these values of the R's reasonably account for the values of $S(xy)$, etc., and the assumptions made that such expressions as $S(x'y')$, $S(ix')$ are negligible seem to be justified, since the correlation coefficients are all of negligible proportions.

17. Let us now proceed to obtain the weights by which we can combine x, y, z, u in order to get i for each month. These are proportional to R_x $S(x'^2)$, etc. (see para. 11). The weights taken are (x) ·556, (y) ·145, (z) ·454, (u) ·162. $\left[\frac{26\cdot 22}{47\cdot 1} = \cdot 556, \text{ etc.}\right]$.

Using these multipliers we get the values of i, or at any rate figures proportional to i. Combining these with the x's, etc., we get $S(i^2) = 10{,}305$, $S(ix) = 2{,}675$, $S(iy) = 12{,}925$, $S(iz) = 7{,}120$, $S(iu) = 22{,}867$. The new R's obtained from these, $R_x = S(ix)\sqrt{S(i^2)}$, etc., are $R_x = 26\cdot 35$, $R_y = 127\cdot 3$, $R_z = 70\cdot 14$, $R_u = 225\cdot 3$. These give $R_x^2 = 694$, $R_y^2 = 16{,}211$, $R_z^2 = 4{,}919$, $R_u^2 = 50{,}745$. When these are subtracted from $S(x^2)$, $S(y^2)$, etc., we get $S(x'^2) = 40\cdot 4$, $S(y'^2) = 734$, $S(z'^2) = 100$, $S(u'^2) = 883$. We may also obtain anew the products of the R's in pairs which are shown below together with $S(xy)$, $S(xz)$, etc.

$S(xy)$	3,331	$S(xz)$	1,818	$S(xu)$	5,900	$S(yz)$	8,877	$S(yu)$	28,248	$S(zu)$	15,668
R_xR_y	3,355	R_xR_z	1,848	R_xR_u	5,935	R_yR_z	8,930	R_yR_u	28,682	R_zR_u	15,799
Diff.	−24		−30		−35		−53		−434		−132
Correlation	−·138		−·450		−·186		−·194		−·540		−·442

18. The correlations between the residuals x', y', z', u' do not appear to be all negligible, three of them are ·450, ·540, ·442. We can verify this from the actual values of x', y', z', u'. If from the i's obtained in the previous paragraph we proceed to get the individual x', y', z', u' for each month we have from these figures :—$S(x'^2) = 40\cdot 6$, $S(y'^2) = 736$, $S(z'^2) = 101$, $S(u'^2) = 883$, and $S(x'y') = -18$, $S(x'z') = -27$, $S(x'u') = -26$, $S(y'z') = -52$, $S(y'u') = -432$, $S(z'u') = -131$. These should be compared with the corresponding figures in para. 17 and it will be seen that they tell the same tale.

19 Thus, the first approximation leads us to a result from which it appears that the residuals x', y', z', u' are independent, but the second approximation does not confirm this, there is some connection between x' and z', between y' and u', and between z' and u' In the first approximation we are using a method based on the assumption that i and x', y', z', u' are all mutually independent In the result this appears to be the case In the second approximation we are relying on the independence of i and each of x', y', z', u', but we are leaving out the assumption that x', y', z', u' are mutually independent What emerges is that apparently these are not all independent of one another It is more reasonable to suppose that the residuals x', y', z', u' are each independent of i, the index itself It is quite possible *a priori* that some of the x', y', z', u' are not independent of one another And this supposition is confirmed by the event

20 The possibility to which attention was drawn in para 14 is thus realized Our original assumption that Group Factors were absent is not justified by the facts We must now consider how to deal with the effect of the presence of Group Factors in our data

21 In para 17 we had significant amounts :—

$$S(x'z') = -30 \qquad S(y'u') = -434, \qquad S(z'u') = -132$$

Let us deal with y', z', u' first

Assume
$$y' = pu' + y'',$$
$$z' = p'u' + z'',$$

that is that the residuals y' and z' each consist of a portion determined by u' together with an independent part Thus we shall assume $S(y''z'')$ $S(y''u')$, $S(z''u')$ are all zero

We have then
$$S(y'u') = pS(u'^2),$$
$$S(z'u') = p'S(u'^2),$$
$$S(y'z') = pp'S(u'^2)$$

In order to estimate the values of p and p' we have the following information

$$883p = -434 \qquad 883p' = -132 \qquad 883pp' = -53$$

The last equation uses $S(y'z') = -53$, which was regarded as negligible From these equations we obtain $p = -·481$, $p' = -·098$ as the most satisfactory estimates These would give

$$S(y'u') = -425, \qquad S(z'u') = -86 \qquad S(y'z') = +41$$

and correspond to correlation coefficients, — ·530 (instead of — ·540), — ·290 (instead of — ·442) — ·153 (instead of — ·190)

22. We may therefore write

$$y' = -\cdot 481u' + y'',$$
$$z' = -\cdot 098u' + z''.$$

Further, since $S(y'^2) = (\cdot 481)^2\,S(u'^2) + S(y''^2)$ and $S(z'^2) = (\cdot 098)^2\,S(u'^2) + S(z''^2)$, we may obtain $S(y''^2) = 530$, $S(z''^2) = 91\cdot 9$, which give the sums of the squares of the independent residuals y'' and z''.

23. Now returning to $S(x'z') = -30$, which was also to be regarded as implying a connection between x' and z', we may write $x' = -p''z'' + x''$, x'' being regarded as absolutely independent, and determine p'' from $S(x'z') = -p''S(z''^2)$. This gives $p'' = -\frac{30}{91\cdot 9} = -\cdot 324$. Thus $x' = -\cdot 324z'' + x''$. We also get $S(x''^2) = 30\cdot 8$.

24. It is useful to write down the following :—

$$\sqrt{S(x''^2)} = 5\cdot 55,\ \sqrt{S(y''^2)} = 23\cdot 01,\ \sqrt{S(z''^2)} = 9\cdot 59,\ \sqrt{S(u'^2)} = 29\cdot 71.$$

25. The original equations $x = r_x i + x'$, etc., may now be written in the form :—

$$x = 26\cdot 35\,\frac{i}{\sqrt{S(i^2)}} - 3\cdot 10\,\frac{z''}{\sqrt{S(z''^2)}} + 5\cdot 55\,\frac{x''}{\sqrt{(x''^2)}},$$

$$y = 127\cdot 3\,\frac{i}{\sqrt{S(i^2)}} - 14\cdot 29\,\frac{u'}{\sqrt{S(u'^2)}} + 23\cdot 01\,\frac{y''}{\sqrt{S(y''^2)}},$$

$$z = 70\cdot 14\,\frac{i}{\sqrt{S(i^2)}} - 2\cdot 90\,\frac{u'}{\sqrt{S(u'^2)}} + 9\cdot 59\,\frac{z''}{\sqrt{S(z''^2)}},$$

$$u = 225\cdot 3\,\frac{i}{\sqrt{S(i^2)}} + 29\cdot 71\,\frac{u'}{\sqrt{S(u'^2)}},$$

where each element in the right-hand side is referred to the root of the sum of the squares of such elements.

In these equations there is the common element i. The equations for x and z also have an additional common element z'', the Group Factor, and so on.

Then these equations give :—

$$S(x^2) = (26\cdot 35)^2 + (3\cdot 10)^2 + (5\cdot 55)^2 = 735,$$
$$S(xz) = 26\cdot 35 \times 70\cdot 14 - 3\cdot 10 \times 9\cdot 59 = 1818,$$

and so on. The residuals x'', y'', z'', u' may be considered as mutually independent.

26. From these equations in para. 25 we may now obtain the following subsidiary equations :—

$$x - \cdot 324z - \cdot 031u = 55\cdot 25\,\frac{i}{\sqrt{S(i^2)}} - 5\cdot 55\,\frac{x''}{\sqrt{S(x''^2)}},$$

$$y - \cdot 481u = 235\cdot 4\,\frac{i}{\sqrt{S(i^2)}} - 23\cdot 01\,\frac{y''}{\sqrt{S(y''^2)}},$$

$$z - \cdot 098u = 92\cdot 14\,\frac{i}{\sqrt{S(i^2)}} - 9\cdot 59\,\frac{z''}{\sqrt{S(z''^2)}},$$

$$u = 225\cdot 3\,\frac{i}{\sqrt{S(i^2)}} - 29\cdot 71\,\frac{u'}{\sqrt{S(u'^2)}}.$$

Here the object has been to obtain a set of equations, each containing the element i on the right-hand side together with the appropriate independent element. Thus, instead of considering x, y, z, u which involve Group Factors, we are going to deal with some simple linear combinations of them which do not involve the presence of Group Factors. Thus we can now deal with these as before, in para. 11.

27. For the computations of i we now have weights

$$\frac{55\cdot 25}{30\cdot 8},\quad \frac{235\cdot 4}{530},\quad \frac{92\cdot 14}{91\cdot 9},\quad \frac{225\cdot 3}{883}$$

appropriate to $x - \cdot 324z - \cdot 031u$, $y + \cdot 481u$, $z + \cdot 098u$, u respectively. These weights are 1·790, ·445, 1·002, ·255.

From them we get the following system of weights appropriate to x, y, z, u :—

(x) 1·790, (y) ·445, (z) 1·582, (u) ·622

These may be written as

40, 10, 36, 14, adding to 100.

Compare these with the weights used previously (see para. 17), viz. :—·556, ·145, ·454, ·162, written as

42, 11, 35, 12, adding to 100.

Obviously not much difference will be observed in the i's obtained by using these new weights when compared with the i's which were previously computed, and which, we saw, led to values of x', y', z', u' which showed the mutual correlations which have now been taken to account.

28. The new values of i thus obtained give us also, $S(i^2) = 10{,}315$, $S(xi) = 2{,}675$, $S(iy) = 12{,}911$, $S(iz) = 7{,}123$, $S(iu) = 22{,}901$. From these we may obtain the correlations between the original statistical series and i, from

$$\frac{S(xi)}{\sqrt{S(x^2)}\,\sqrt{S(i^2)}},\ \text{etc.}$$

These correlations are (x) ·972, (y) ·977, (z) ·990, (u) ·992. Thus each of these statistical series gives a good indication of the trend of Business Activity (as judged from this combination of the four of them). The best indicator appears to be U, Building Activity, and the least useful X, Employment. It must be remembered that the r's just calculated do not pretend to serve as accurate indicators of the change in Business Activity in general. We have only been using 4 statistical series with which to illustrate a method.

29. Let us compare the weights which have been deduced as appropriate, roughly 4, 1, 3½, 1 respectively, to be applied to X, Y, Z, U, with those used by the *Economist*. Their weights for these four statistical series are 10, 2, 2, 2, or 5, 1, 1, 1. We would say that they are overvaluing employment (X) and undervaluing Motor Vehicles (Z). We may mention that our method of determining weights automatically takes account of the relative size of the movements in the different series.

30. The foregoing illustration should serve to indicate the method. From an analysis of the Variances and Covariances of a number of statistical series we can deduce the way in which these series can be split up into their components. The result obtained should agree with the original assumptions on which the method is based. If this agreement is not achieved we must proceed further until we reach the stage when there is such agreement.

31. Now let us consider the whole data of 14 statistical series which form the basis of the construction of the *Economist* Index of Business Activity. These series consist of Index Numbers.

X, Employment.
Y, Coal Consumption.
Z, Electricity Consumption.
U, Merchandise on Railways.
V, Commercial Motor Vehicles in Use.
W, Postal Receipts.
R, Building Activity.
S, Iron and Steel Consumption.
T, Cotton Consumption.
P, Imports of Raw Materials.
Q, Exports of British Manufactures.
L, Shipping Activity.
M, Metropolitan, Country and Provincial Bank Clearings.
N, Town Clearings.

When the various product-sums are obtained, two of them, that for Cotton Consumption and Coal Consumption, and that for Cotton Consumption and Town Clearings, are negative.

As our method of analysis starts off by using logarithms, we decided to omit the series '*T*', Cotton Consumption, from the preliminary work. We are left with 13 series.

32. Working on the simplest assumption that each member of a series can be split up into a common element and a residual which is independent, *i.e.* not assuming the existence of Group Factors at all, we can get the appropriate R's, which multiplied in pairs enable us to get comparisons with the original product-sums, $S(xy)$, etc. The Table on p. 32 shows the results of this preliminary analysis.

33. It will be seen that there are some very large discrepancies amongst these pairs of figures. For instance, $S(pn) = 1{,}027$ and $R_pR_n = 1{,}884$. Again $S(pl) = 989$ and $R_pR_l = 590$. Obviously, the existence of Group Factors must be taken into account here. On the other hand, all the pairs involving w show comparatively small discrepancies.

34. The product-sums involving t may be brought in as follows. When we have arrived at values of i for the different periods given as weighted averages of all the elements with the exception of t—in its simplest form the formula is that in para. 11 :—

$$\frac{i}{\sqrt{S(i^2)}} = \frac{x\frac{R_x}{S(x'^2)} + y\frac{R_y}{S(y'^2)} + \dots}{\frac{R_x^2}{S(x'^2)} + \frac{R_y^2}{S(y'^2)} + \dots},$$

we may obtain

$$\frac{S(it)}{\sqrt{S(i^2)}} = \frac{S(xt)\frac{R_x}{S(x'^2)} + S(yt)\frac{R_y}{S(y'^2)} + \dots}{\frac{R_x^2}{S(x'^2)} + R_y^2}.$$

But $S(it) = r_t S(i^2)$, and therefore

$$R_t = r_t\sqrt{S(i^2)} = \frac{S(xt)\cdot\frac{R_x}{S(x'^2)} + S(yt)\cdot\frac{R_y}{S(y'^2)} + \dots}{\frac{R_x^2}{S(x'^2)} + \frac{R_y^2}{S(y'^2)} + \dots}.$$

Hence we are led to a first approximation to R_t.

35. Using the method outlined in paras. 10–14, we obtain eventually the following results, giving each constituent $x, y, z, \dots$ in terms of i (the common element) and residuals which include Group Factors and absolutely independent items. In the following equations $\frac{i}{\sqrt{S(i^2)}}$ is written for convenience as $[i]$, $\frac{x'}{\sqrt{S(x'^2)}}$ as $[x']$, and so on.

$$
\begin{aligned}
x &= 26{\cdot}8[i] + 8{\cdot}24[x'].\\
y &= 25{\cdot}6[i] - 11{\cdot}9[u'] - 7{\cdot}11[v'] - 10{\cdot}3[r'] + 8{\cdot}26[s']\\
&\quad + 16{\cdot}7[y'].\\
z &= 127{\cdot}9[i] - 10{\cdot}1[u'] + 11{\cdot}4[v'] - 8{\cdot}95[r'] - 8{\cdot}13[l']\\
&\quad - 6{\cdot}35[m'] - 6{\cdot}50[n'] - 14{\cdot}9[z'].\\
u &= 26{\cdot}4[i] - 17{\cdot}5[v'] - 6{\cdot}25[r'] + 12{\cdot}0[s'] + 17{\cdot}4[u'].\\
v &= 66{\cdot}3[i] + 7{\cdot}49[x'] + 18{\cdot}8[v'].\\
w &= 13{\cdot}5[i] + 10{\cdot}8[w'].\\
r &= 215{\cdot}2[i] + 19{\cdot}0[x'] - 24{\cdot}4[v'] + 38{\cdot}0[r'].\\
s &= 110{\cdot}5[i] + 38{\cdot}0[x'] - 21{\cdot}8[v'] - 24{\cdot}8[l'] + 51{\cdot}0[s'].\\
t &= 5{\cdot}99[i] + 31{\cdot}2[x'] - 14{\cdot}1[l'] + 38{\cdot}2[t'].\\
p &= 48{\cdot}5[i] + 31{\cdot}2[x'] + 11{\cdot}2[r'] - 20{\cdot}4[s'] - 27{\cdot}0[t'] -\\
&\quad 23{\cdot}9[l'] - 18{\cdot}0[m'] - 46{\cdot}4[p'].\\
q &= 34{\cdot}6[i] + 8{\cdot}03[v'] + 21{\cdot}5[q'].\\
l &= 12{\cdot}1[i] - 7{\cdot}41[v'] + 17{\cdot}7[l'].\\
m &= 38{\cdot}0[i] + 4{\cdot}30[x'] - 8{\cdot}95[u'] - 7{\cdot}70[v'] + 13{\cdot}2[m'].\\
n &= 37{\cdot}7[i] - 27{\cdot}8[x'] - 23{\cdot}7[u'] - 60{\cdot}2[n'].
\end{aligned}
$$

In the above, the r residual, for instance, is split up into 2 parts $[x']$ and $[r']$.

36. In the right-hand sides of the above equations all the items i, x', y', z', . . . are supposed to be mutually independent. We should have, from these equations, such a result as

$$
\begin{aligned}
S(y^2) &= 25{\cdot}6^2 + 11{\cdot}9^2 + 7{\cdot}11^2 + 10{\cdot}3^2 + 8{\cdot}26^2 + 16{\cdot}7^2\\
&= 655{\cdot}4 + 141{\cdot}6 + 50{\cdot}6 + 106{\cdot}1 + 68{\cdot}2 + 278{\cdot}9\\
&= 1{,}301.
\end{aligned}
$$

Actually $S(y^2) = 1{,}209$. The difference 92 is due to the sum of the products of i with the independent elements. The size of this difference is consistent with the independence of i and these elements. Also

$$
\begin{aligned}
S(yz) &= 25{\cdot}6 \times 127{\cdot}9 + 11{\cdot}9 \times 10{\cdot}1 - 7{\cdot}11 \times 11{\cdot}4 - 10{\cdot}3 \times 8{\cdot}95\\
&= 3{,}275 + 120{\cdot}4 - 81{\cdot}5 + 92{\cdot}3\\
&= 3{,}406.
\end{aligned}
$$

Actually $S(yz) = 3{,}219$. The difference 187 is partly due to the sum of the products of i with the residuals not being exactly zero, and partly due to the sums of the products, such as $S(s'l')$, not being exactly zero. The observed difference is negligible.

37. The system of equations in para. 35 accounts, with negligible differences, for the original computed values of $S(x^2)$, $S(y^2)$, etc., and for all the original computed product sums $S(xy)$, $S(xz)$, etc.

38. If we use these equations to get weights for the calculation of

The Product-Sums (S(xy), *etc.*) *together with the Products of the* R's *in pairs, and the Differences between them as Percentages of the Products of the* R's.

		x	*y*	*z*	*u*	*v*	*w*	*t*	*s*	*p*	*q*	*l*	*m*
	Product-Sums... ...	639											
y	*R* × *R*	690											
	Diff. (per cent.) ...	− 8											
	Product-Sums... ...	3.331	3.219										
z	*R* × *R*	3.373	3.214										
	Diff. (per cent.) ...	− 1	+ 0										
	Product-Sums... ...	791	778	3.391									
u	*R* × *R*	719	685	3.350									
	Diff. (per cent.) ...	+ 10	+ 13	+ 1									
	Product-Sums... ...	1.818	1.487	8.877	1,641								
v	*R* × *R*	1,787	1,706	8.337	1,778								
	Diff. (per cent.) ...	+ 7	− 15	+ 6	− 8								
	Product-Sums ...	359	366	1.745	357	925							
w	*R* × *R*	364	348	1.694	361	897							
	Diff. (per cent.) ...	− 1	+ 5	+ 3	− 1	+ 3							
	Product-Sums... ...	5,900	4.734	28,248	5,778	15,668	2,992						
r	*R* × *R*	5.794	5,573	27.040	5,768	11,355	2,917						
	Diff. (per cent.) ...	+ 2	− 17	+ 4	+ 0	+ 9	+ 3						
	Product Sums... ...	3.112	3.154	13.483	4,154	7,232	1,576	23.775					
s	*R* × *R*	3,155	3.013	14.723	3,141	7,816	1,589	25.290					
	Diff. (per cent.) ...	− 1	+ 5	− 9	+ 32	− 8	− 1	− 6					
	Product-Sums... ...	1.546	934	5.988	1.297	3,700	612	12.064	6.137				
p	*R* × *R*	1.306	1.245	6.081	1.297	3,229	656	10.470	5.702				
	Diff. (per cent.) ...	+ 18	− 33	− 2	0	+ 5	− 7	+ 15	+ 8				
	Product-Sums ...	958	823	4.543	997	2.567	471	8,138	3 608	1,663			
q	*R* × *R*	931	889	4.335	925	2,301	469	7,465	4.061	1,679			
	Diff. (per cent.) ...	+ 3	− 8	− 5	+ 8	+ 11	+ 0	+ 9	− 13	− 1			
	Product Sums	305	401	1.224	371	636	139	2.253	1.834	989	314		
l	*R* × *R*	327	513	1.528	326	809	165	2 624	1.429	590	421		
	Diff. (per cent.) ...	− 7	− 28	− 25	+ 14	− 27	− 18	− 16	+ 28	+ 67	− 34		
	Product Sums... ...	1.013	933	4.923	811	2,716	544	8.687	4,086	1,781	1.423	428	
m	*R* × *R*	1.030	984	4.808	1.026	2.553	519	8.260	4 498	1 858	1.324	466	
	Diff. (per cent.) ...	− 2	− 5	− 2	− 26	+ 6	− 5	+ 5	− 10	− 4	− 7	− 9	
	Product-Sums... ...	919	1.361	5.482	851	2,672	572	9.326	3.809	1.027	1.458	521	1 966
n	*R* × *R*	1.047	998	4.864	1,038	2.582	526	8.375	4.560	1.884	1.343	472	1.486
	Diff. (per cent.) ...	− 14	− 36	− 13	− 22	+ 4	− 9	− 11	− 20	− 83	− 9	− 10	− [illegible]

the i's on the lines indicated in paras. 26–27 we have the following system of weights :—

x	y	z	u	v	w	r	s	t	p	q	l	m	n
1·51	·15	1·07	1·87	−·0006	·11	·75	−·51	−·090	·013	·036	1·36	·81	·18

Some of these actually are negative. Apart from the common element i, the constituent s, for instance, is affecting y, u, and p (negatively), as will be seen from the equations in para. 35. Thus, apparently the constituent s is already over-represented by the weights of y and u, and to counterbalance this the weight of s is negative.

39. When we use these weights to get the i's, and from them the values of $R_x \frac{i}{\sqrt{S(i^2)}}$, $R_y \frac{i}{\sqrt{S(i^2)}}$, etc., for each month, and then the individual monthly residuals for each one of the series, we can compute the sums of the squares of the residuals. We can also compute the product-sums of these residuals. These may be compared with those derived from the formulæ in para. 35. Thus the sum of the squares of the x-residuals from the formula in para. 35 should be $8{\cdot}24^2 = 67{\cdot}9$. Actually, from the computed residuals, it is 46·7, the difference being due to the product-sum of the i's and the x''s not being exactly zero. The sum of the squares of the y-residuals from the formula in para. 35 should be $11{\cdot}9^2 + 7{\cdot}11^2 + 10{\cdot}3^2 + 8{\cdot}26^2 + 16{\cdot}7^2 = 645$. From the computed residuals, it is 616. Again, the difference is due to the correlation between the i's and the y-residuals not being exactly zero, though it is negligible. According to the formulæ in para. 35, the product-sum of the x and y residuals should be zero; actually the product-sum computed from the residuals is 0.

40. The following Tables give the full results compared.

Sums of Squares of Residuals.

	x	y	z	u	v	w	r	s	t	p	q	l	m	n
From Formulæ, para. 35	67·9	645	681	793	108	117	2398	5135	2635	5293	527	367	333	1961
From Residuals... ...	46·7	616	613	801	115	111	2261	5201	2621	5287	195	373	311	1931

The differences are accounted for by the negligible correlations between i and the residuals :—

Correlations between i *and Residuals.*

x	y	z	u	v	w	r	s	t	p	q	l	m	n
−·09	−·05	+·00	+·09	+·08	−·01	+·16	−·03	−·02	+·02	+·07	−·01	+·01	+·10

The discrepancies are due to the correlation between the various independent elements which we have assumed to be negligible.

Product-Sums of the Residuals.

(*a*) From the Formulæ in para. 35.
(*b*) From the Residuals.

	x	y	z	u	v	w	r	s	t	p	q	l	m
y (*a*)	0												
(*b*)	0												
z (*a*)	0	+131											
(*b*)	−18	+106											
u (*a*)	0	+81	−319										
(*b*)	+32	+72	−295										
v (*a*)	+62	−134	+214	−329									
(*b*)	+36	−170	+210	−314									
w (*a*)	0	0	0	0	0								
(*b*)	+8	+40	+37	−29	+17								
r (*a*)	+156	−565	−61	−664	+600	0							
(*b*)	+63	−694	−138	−620	+589	+18							
s (*a*)	+313	+576	−451	+994	−134	0	+190						
(*b*)	+278	+522	−317	+1028	−108	+131	−271						
t (*a*)	+257	0	−114	0	+234	0	+593	+1534					
(*b*)	+231	−210	−183	+13	+127	−33	+659	+992					
p (*a*)	+257	−284	−180	−315	+234	0	+1017	+735	+2342				
(*b*)	+236	−283	−380	−139	+317	−55	+988	+743	+2299				
q (*a*)	0	−57	+92	−140	+151	0	+196	−175	0	0			
(*b*)	+11	−58	−63	−40	+121	−12	+130	−295	+61	−133			
l (*a*)	0	+53	−228	+130	−139	0	−181	+600	+249	+422	−60		
(*b*)	+13	+130	−199	+47	−122	−10	−232	+630	+240	+432	−89		
m (*a*)	+35	+52	+94	−291	+176	0	+270	−5	+184	−104	+62	−57	
(*b*)	+12	+2	+52	−290	+127	+34	+208	−38	+158	−121	+48	+3	
n (*a*)	−228	+282	−153	−416	−208	0	−528	−1055	−866	−866	0	0	+93
(*b*)	−254	+266	−208	−417	−343	−25	−526	−1024	−720	−1184	−139	+18	+267

41. These discrepancies are given in the next Table, together with the appropriate correlation coefficient. *E.g.*

$$r_{x'u'} = \frac{+\,32}{8{\cdot}24 \times 17{\cdot}4} = +\,0{\cdot}22\,.\ \sqrt{S(x'^2)} = 8{\cdot}24,\ \sqrt{S(u'^2)} = 17{\cdot}4.$$

(See para. 35.)

42. In the foregoing work, correlation coefficients of a value greater than 0·3 have been regarded as possibly significant, and account has been taken of them. This figure has been partly used because correlation coefficients less than 0·3 indicate a feeble relationship, and partly because, from the usual formula, *S.D.* of $r = \frac{1 - r^2}{\sqrt{n}}$, we get when $n = 48$ and $r = 0$, $S.D._r = {\cdot}144$. Twice this *S.D.* gives ·288 as a reasonable indication of the size of a correlation coefficient which might emerge if the data consist of 48 pairs of values of two variables which are not significantly related.

43. The Table in para. 41 includes a number of correlation coefficients which are mostly insignificant. The only one to which

Differences between Product-Sums from Residuals and from Formulæ, and Correlation Coefficients.

(*a*) Differences.
(*b*) Correlation Coefficients.

	x	*y*	*z*	*u*	*v*	*w*	*r*	*s*	*t*	*p*	*q*	*l*	*m*
y (*a*) (*b*)	0 0												
z (*a*) (*b*)	−18 −·15	−25 −·10											
u (*a*) (*b*)	+32 +·22	−9 −·03	+24 +·09										
v (*a*) (*b*)	−26 −·17	−36 −·11	−4 −·01	+15 +·05									
w (*a*) (*b*)	+8 +·09	+40 +·22	+37 +·23	−29 −·15	+17 +·08								
r (*a*) (*b*)	−93 −·30	−129 −·20	−77 −·14	+44 +·07	−11 −·02	+18 +·04							
s (*a*) (*b*)	−35 −·08	−54 −·06	+134 +·18	+34 +·04	+26 +·03	+131 +·24	−461 −·24						
t (*a*) (*b*)	−26 −·08	−210 −·33	−69 −·12	+13 + 02	−107 −·15	−33 − 08	+66 +·05	−542 −·28					
p (*a*) (*b*)	−21 −·06	+1 +·00	−200 −·29	+176 +·22	+83 +·10	−55 −·11	−29 −·02	+8 +·00	−43 − 02				
q (*a*) (*b*)	+11 +·06	−1 −·00	−155 −·48	+100 +·27	−30 −·07	−12 −·05	−66 −·08	−120 −·11	+61 + 07	−133 −·13			
l (*a*) (*b*)	+13 +·09	+77 +·26	+29 +·11	−83 −·27	+17 +·05	−10 −·05	−51 −·08	+30 +·03	−9 −·01	+10 +·01	−29 −·08		
m (*a*) (*b*)	−23 −·21	−50 −·23	−42 −·21	+1 +·00	−49 −·20	+34 +·24	−62 −·12	−33 −·05	+24 +·05	−17 −·03	−14 −·05	+60 + 26	
n (*a*) (*b*)	−26 −·05	−16 −·01	−55 −·06	−1 −·00	−135 −·12	−25 −·04	+2 +·00	+31 +·01	+146 +·06	−318 −·11	−139 −·11	+18 +·02	+174 +·22

Square Roots of Sums of Squares of Independent Elements.

8·24	16·7	14·9	17·4	18·8	10·8	38·0	51·0	38·2	46·4	21·5	17·7	13·2	60·2
x	*y*	*z*	*u*	*v*	*w*	*r*	*s*	*t*	*p*	*q*	*l*	*m*	*n*

attention need be drawn is that giving the correlation corresponding to the (*zq*) item in the Table.

Thus we may say that the figures in the Table in para. 40 are, apart from the (*zq*) item, for practical purposes equivalent. This means that practically the product-sums expected from the Formulæ in para. 35 are identical with those computed from the residuals themselves.

We conclude then that these formulæ do express the various elements *x*, *y*, *z*, . . . in terms of the common factor (*i*) and the various independent elements, and that the weights derived from these formulæ for the purpose of computing the *i*'s are reasonable weights.

44. From the i-series and the original x, y, z, . . . series we can now obtain the correlations between x, y, z, . . . and i. They are :—

x	y	z	u	v	w	r	s	t	p	q	l	m	n
·969	·701	·978	·719	·960	·782	·980	·830	·092	·566	·851	199	909	·510

The series which correlate most highly with i are x, z, v, r, *i.e.* Employment, Electricity Consumption, Commercial Motors in Use, and Building Activity respectively. These are the four series which were used earlier to serve as an illustration of the method. Any one of these statistical series will serve as a very useful indicator of the trend of Business Activity. The correlation between the index obtained by combining these four series in the manner described in para. 27 and the new index just obtained by using the 14 series is ·980. So the index obtained from the four selected series gives no greater precision as an approximation to the index obtained by using the 14 series, than is got by using the series for Building Activity as the sole indicator.

45. One of the series (t) (Cotton Consumption) correlates with the new index to a negligible extent (·092). In the period under review the common element in the make-up of this series was overwhelmingly outweighted by the other factors. One doubts whether it was worth while using such a series as one of the constituents of the Business Activity Index. The other low correlations shown in para. 44 are l (Shipping), ·499, n (Town Clearings), ·549, p (Raw Material Imports), ·566. These would all individually serve as poor indicators of the general trend of Business Activity.

46. Of the other series, in the order of the correlation coefficients, we have m (Metropolitan Bank Clearings), ·909, q (Exports of British Manufacture), ·854, s (Iron and Steel Consumption), ·830, w (Postal Receipts), ·782, u (Merchandise on Railways), ·719, y (Coal Consumption), ·701. The comparatively small connection between Coal and the index is notable.

47. It will be observed that these various correlation coefficients show that some of the more "modern" statistical series were better indicators of the trend of Business Activity than some of the "Classical" series. High correlation coefficients exist for Electricity Consumption, Commercial Motors, Building Activity, all "modern." Lower correlations exist for Coal Consumption, Cotton Consumption, Shipping, Raw Material Imports, all "classical" series, which have been used as pointers to economic activity for decades.

48. This point may be put in another way. In the period to which our data refer, 1931–35, the rising tendency in business activity has been described as an internal boom only. So it is not surprising to find our results reflecting this. Shipping had a low correlation

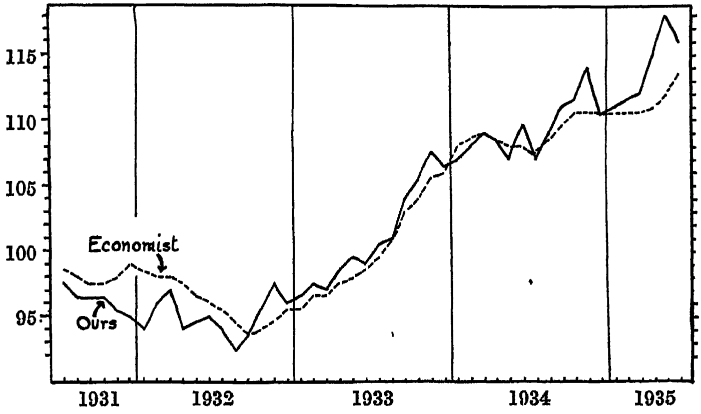
with the trend of Business Activity compared with Motor Vehicles, Cotton is out of the picture, but Building is well to the fore.

49. This raises another point. If instead of the data for 1931–35, another set of figures, *e.g.* 1935–39, were examined in the same way, I should not be surprised to find that the weights allotted to the constituent series became altered. This is presupposing the possibility that the centre of gravity of Business Activity moved. Thus I think it is reasonable that the weighting system should be changed from time to time.

50. We may, as a matter of interest, compare our system of weights with that of the *Economist*. They are given below :—

	x	*y*	*z*	*u*	*v*	*w*	*r*	*s*	*t*	*p*	*q*	*l*	*m*	*n*
Economist ...	10	1	2	4	2	3	2	2	1	2	3	2	4	1
Ours	1·51	·15	1·07	1·87	—·0006	·11	·75	—·51	—·090	·013	·036	1·36	·81	·18
Ratios: $\frac{\textit{Economist}}{\text{Ours}}$	6·6	8·0	1·9	2·1	— 3333	27	2·7	—3·9	—11·1	154	83	1·5	4·9	5·6

Judging by our system of weighting the *Economist's* weights for *v* (Commercial Motors), *s* (Iron and Steel), *t* (Cotton Consumption), *w* (Postal Receipts), *p* (Raw Material Imports), *q* (Exports of British Manufactures) are too high, while those for *z* (Electricity), *u* (Merchandise on Railways), *r* (Building Activity), *l* (Shipping Activity), are too low.



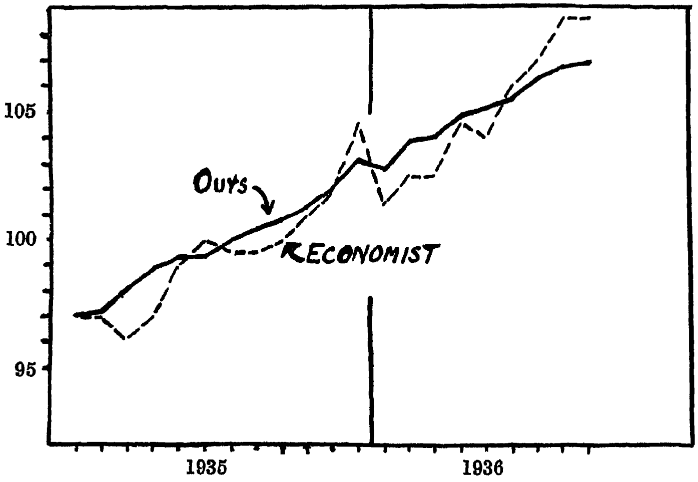
Indices of Business Activity (1924 = 100).

DIAGRAM 1.

51. Finally, we show in diagram 1 the course of the *Economist* Index with that of ours over the period. Our figure emphasizes the monthly fluctuations, which have been reduced in the *Economist*

Index. Apart from these fluctuations the long time movement in our index shows the same general trend as in that of the *Economist*.

52. Since writing the above the *Economist* has changed the basis of their Index from 1924 to 1935, and some months have elapsed. It was thought worth while to quote the most recent figures of the *Economist* (from the Trade Supplement of Oct. 24, 1936). In addition, it is with some diffidence that I have calculated an Index based only on four constituents, Employment, Electricity Consumption, Commercial Motors and Building Activity, using weights 4, 1, 3½, 1 respectively. The figures are given in the Table on p. 39 and the *Economist* figures and ours are shown also in Diagram 2.



Indices of Business Activity (1935 = 100).

DIAGRAM 2.

Our figures are very close to the *Economist's* 12-month Moving Averages.

53. In conclusion, a few remarks *à propos* the inter-correlations due to the presence of Group Factors will be of interest. The product-sums are given in the Table in para. 40. Some of the correlation coefficients which emerge are quite large. For example, the product-sum for (vr) is + 589. The sums of the squared residuals for v and r are 415 and 2,264 respectively. (See para 40.) These gave a correlation coefficient $\frac{+589}{\sqrt{415}\sqrt{2264}} = \cdot 61$. The larger correlation coefficients (those greater than ·45) are given below.

Correlations between Residuals due to Group Factors.

$xs + {\cdot}56$	$yr - {\cdot}59$	$um - {\cdot}58$
$xt + {\cdot}66$	$uv - {\cdot}55$	$vr + {\cdot}61$
$xp + {\cdot}48$	$ur - {\cdot}46$	$sl + {\cdot}45$
$xn - {\cdot}53$	$us + {\cdot}50$	$tp + {\cdot}62$

Indices of Business Activity.

	Economist.	*Economist* (12 months Moving Average).	Ours, using 4 Series.
1935 1	97	97	97·0
2	97	97¼	97·2
3	96	97¾	98·1
4	97	98¼	98·9
5	99	98¾	99·3
6	100	99¼	99·3
7	99½	99¾	100·0
8	99½	100¼	100·4
9	100	100¾	100·8
10	101	101¼	101·3
11	102	101¾	102·0
12	104½	102¼	103·1
1936 1	101½	102¾	102·8
2	102½	103¼	103·9
3	102½	104	104·0
4	104½		104·8
5	104		105·1
6	106		105·4
7	107		106·3
8	108½		106·7
9	108½		106·9

Apart from the common factor, movements in *s* (Iron and Steel Consumption), *t* (Cotton Consumption), *p* (Raw Material Imports) are positively related to movements in (*x*) Employment, while *n* (Town Clearings) is negatively related to movements in *x* (Employment). *r* (Building Activity) is positively related with *v* (Commercial Motors) and negatively with *y* (Coal Consumption) and *u* (Merchandise on Railways). *u* (Merchandise on Railways) is positively related to *s* (Iron and Steel Consumption) and negatively with *v* (Commercial Motors in Use) and *r* (Building Activity) and *m* (Metropolitan Clearings). *s* (Iron and Steel) is positively linked with *u* (Merchandise on Railways), *l* (Shipping), and *x* (Employment). *p* (Imports of Raw Materials) is positively correlated with *t* (Cotton Consumption). These interrelations are of such a nature as would be expected, though I do not see why Employment and Town Clearings should be negatively connected.

w (Postal Receipts) is not significantly related with any one of the others, all the coefficients are less than 0·2. *q* (British Exports) also is unrelated significantly with any of the others, all the coefficients being less than 0·3.

DISCUSSION ON DR. RHODES'S PAPER.

PROFESSOR BOWLEY: It gives me great pleasure to propose a vote of thanks to the reader of this paper, for many reasons. One is that it is an indication that the activity of the Statistical Department in the School of Economics has not suffered since I left it, for the latter part of the paper seems to have taken at least as much effort as the former part. An immense amount of work is concealed by the results of calculations and equations, and still more by a summary of the paper into the space of quarter of an hour. If you set yourself the problem of working out the innumerable coefficients of correlation, you may get some conception of the labour behind this paper.

For better comprehension of the part of the paper not read, I suggest it would be as well to get hold of the book by Hartog and Rhodes, "An Examination of Examiners," and to read especially the article on "The Precision of Index Numbers," in the 1936 *Journal* (p. 367). I was prepared for some of the methods used by having read these earlier studies.

With reference to paragraphs 8–11, which are dominant in the method, I dare say many will recognize that the problem is the same as that of Professor Spearman in separating the general from the special factors in the study of ability. The problem is almost exactly the same when stated algebraically, and it has a similar meaning. Examination marks, on the one hand, awarded for a special subject, are taken as the result of a combination of general ability and aptitude for the subject; on the other hand, the change of a particular index of business activity is the result of a general change and a specific change.

The result obtained by Dr. Rhodes in paragraph 11 proves to be, when the necessary changes in notation are made, the same as Spearman's, so that those of us who have followed through that part of Spearman's work are prepared to assent to the adequacy of that formula. The result is the same, but one step differs. Dr. Rhodes uses the method of least squares, while Spearman aimed at that system of weights which would give an index of maximum correlation with the true index. The two methods give the same formula, but it is interesting to consider the difference of the hypotheses.

In paragraph 15 these R's make up Spearman's tetrads, the products being obtained by interchange of suffixes. If the relations used by Spearman and others between these tetrads hold, there is no common factor in minor groups, and the development of the equations involving Dr. Rhodes' common factors is in these cases unnecessary. This seems to be the natural test to apply, and I find it a little difficult to follow paragraph 19. The elaboration therein used shows that some quantities have been supposed to be independent which are in fact dependent. I should have expected that the table in paragraph 15 indicated that sufficiently, and I do not quite understand why some of the figures in paragraph 15 differ from the first table of correlations. I should have expected that the figures in the table on p. 32 would have been a sufficient indication as to whether a common factor was wanted or not.

I think that I shall spend my time best in speaking further about the method, since others are much more competent than I to speak on the general question of the index.

I am a good deal intrigued by the note to paragraph 13, which I should like to see embodied in a really prominent part of the paper: "Business Activity is an unmeasurable abstraction. We can only measure the ratio of the index to its own standard deviation." I am rather surprised that Dr. Rhodes in paragraph 47 talks of the trend of Business Activity. I would like to put this point of view: supposing that the original series were all linear, with no fluctuations from the straight line, then the weighting of the index would give no indication of the trend of business activity; we should simply have a straight line, the direction of which was unknown. There is nothing in the formula to tell the angle. This is very important, and it is still to be explained how it is that in the end Dr. Rhodes gets a rising line that fits in with the *Economist* index.

The paper is not directed towards finding the best system of weights from Mr. Crowther's point of view, but that system of weights which gives the greatest inter-consistency arising from the 14 different observations. That is different from finding out what are the most appropriate weights from Mr. Crowther's standpoint I hope that if this statement is correct Dr. Rhodes will emphasize it in his reply.

Quite apart from that, here is another point of view. In making any index out of separate series, the result must depend upon the kind of things you put in as well as on the weights. You will never get a satisfactory index of retail prices if you put in wholesale prices only. Here you will not get a satisfactory index unless the constituents are well chosen. I hesitated when the *Economist* index was first published to make use of it, because the use of electricity was rising very fast, and in itself would give too rapid an indication of activity. If we made an index of commercial cars and building activities, however we weighted them, we should get a rapidly rising line during the last three years, while if we took cotton and some other things, we should not get a rising line. The trend of results from weighting will be determined by the contents put in originally.

There is only one other point I would like to make. I do not know whether, in using this index, seasonal fluctuations are eliminated. I was surprised to find that the importation of raw materials had so little weight. Importation fluctuates extraordinarily during the year, and if the crude figures were used I should expect to find a very imperfect indication; but a connection would be expected if seasonal movements could be eliminated. There again, if Dr. Rhodes, or anyone else, has patience to pursue the task any further, I should like to consider the question of the time lag. I should like someone to find out the time lag between the importation of imports and their manufacture, and between the passing of building plans and the construction of houses. Of course, these figures are evidence more of future business activity than of the present.

I hope I have raised enough questions to give Dr. Rhodes plenty to explain, and I have left a great deal to others of the audience who have studied this question.

Dr. Isserlis: It is a very great pleasure to me to second this vote of thanks to my old friend Dr. Rhodes for the most interesting paper he has read to us to-night, and as, like Professor Bowley, I am going to confine my remarks to the theoretical side, I may perhaps be allowed to begin by making an aside on a matter with which I am not familiar—the application side. I am descended from a race who were making bricks, sometimes without straw, in Egypt, and I was surprised to hear that building activity is one of the modern series as distinct from the classical. The idea of analysing a number of statistical series in order to discover whether a common factor exists, and, if it does, to determine what linear combination of the constituent series will give maximum prominence to this common factor, is familiar to psychologists, but has not, so far as I know, been applied to economics. There is one important difference. Dr. Rhodes assumes that a common factor actually exists in his various series. The proposed analysis cannot lead to the answer that there is no common factor. This means that the constituent series remain a matter of personal choice limited only by the consideration that a series might be omitted if the analysis assigns to it a very small weight. As regards the actual method, its weakness, as well as its strength, is to be found in paragraph 2 on p. 19. The assumption that the residuals of the special factor are normally distributed leads to a neat and simple solution of the problem of weighting. But is this assumption likely to be true of the 14 time series employed in the *Economist* index? It doesn't seem likely for rapidly growing time series like electricity consumption and commercial motor vehicles in use. This point could usefully be tested. Another point that will have to be watched carefully in application is the occurrence and meaning of negative weights. I remembered what a former President had told us about answering a Minister's question as to the price of wool, and applied Dr. Rhodes's method to the price of wheat. I took three series of weekly Liverpool prices in 1930. Manitoba No. 1, Chicago Hard Winter No. 2, and Rosafe (Argentine) Parcels afloat. The third of these was the cheapest. The analysis gave weights of approximately minus a quarter, minus a quarter and plus one and a half, with the result that the "common factor" price of wheat at Liverpool turned out to be less than each of the three prices for every week. The minister would not have liked it: as a practical man he would expect an answer between the highest—Manitoba No. 1—and the lowest—Argentine afloat.

I have one further remark on the purely mathematical side, which applies to the analyses in the earlier pages. When Dr. Rhodes has to determine four variables from six equations he uses least squares. Now, whatever justification there may be for using the method of least squares for the solution of the equations as they stand, that justification will hardly hold for applying the method to the equations obtained by taking logarithms of both sides. What Dr. Rhodes wants is an approximate solution in which all the equations are used, preferably symmetrically. This, of course, he gets, but any other symmetrical method of combining the six equations would be equally reasonable. The obvious method would be to multiply the six equations—I am considering p. 22—to find the value of the cube of $R_x R_y R_z R_u$ and then dividing by the products of the equations in sets of three. If we do this we get $R_x = 687{\cdot}46$, $R_y = 16{,}072$, $R_z = 4865{\cdot}3$, $R_u = 50{,}245$, and to the significant figures shown, precisely the same values for R_x, R_y, R_z, R_u as those given in the text. If, however, it is desired to apply the method of least squares to the equations themselves (not their logarithms), it is easy to show that the solution is

$$R_x = \tfrac{1}{3}\left(\sqrt{\frac{S(xy)S(xu)}{S(yu)}} + \sqrt{\frac{S(xy)S(xz)}{S(yz)}} + \cdot\ /\overline{S(xz)(xu)}\right.$$

etc., giving $R_x = 26{\cdot}16$, $R_y = 126{\cdot}8$, $R_z = 69{\cdot}75$, $R_u = 224{\cdot}1$, agreeing with the values in the text to one place of decimals. I have dealt with this point, although in the present case there would have been hardly any difference in the numerical results, because in my opinion the mere fact that the normal equations given by the method often prove intractable is no justification for replacing them by least squares equations for functions of the original variables, such as logarithms, unless we are satisfied independently that the method is still justified for the new functions. Incidentally, it is possible the elementary method would have made it unnecessary to omit cotton consumption and town clearings (see pp. 29, 30) from the preliminary work. I am not sure this is the case, as imaginary weights might have been involved. These remarks are made by way of friendly criticism of a welcome new departure in applied statistics.

I congratulate Dr. Rhodes, and have great pleasure in seconding this vote of thanks.

MR. CROWTHER felt that he appeared that evening in the somewhat unfavourable position of a *corpus vile*, because it was upon the basis of the paper which he had had the honour of presenting to the Society nearly three years before that Dr. Rhodes had built his researches, on the ingenuity and industry of which all would be very ready to congratulate him. On the occasion on which he had himself had the temerity to present this index to the Society he had remarked that he was in the position of a patent-medicine manufacturer explaining the composition of his remedy to the General Medical Council. He found now that even that was not sufficiently modest, as he had been reduced to the position of a pill manufacturer! He had made no particular claim to be able to cure; he had never attempted to suggest that the index would make the country prosperous; it was thus a peculiar kind of pill, for he would be pleased if only it would tell the patient just how well he was.

It was considered rather bad taste for a corpse to appear at a feast, but it must be even worse taste for a corpse to speak at a feast. Nevertheless he would like to offer one or two remarks, although he did so with some hesitation, because he came as an economist and —he would remark in parenthesis—as a private economist, and not as an official representative of the newspaper on which he served. He came as an economist whose mathematical equipment was totally inadequate to cope with Dr. Rhodes's paper. The rule of four he could manage, sometimes with accuracy; he ventured with a little trepidation some way across the threshold of algebra, but the mere sight of Greek symbols made him retire into his shell; therefore, since previous speakers had already discussed the method, he asked permission to leave the signs and symbols alone.

The issue, so far as there was one, between Dr. Rhodes and himself was confined to the correct method of weighting the constituent elements of the index of business activity. He welcomed the fact that that was apparently the chief issue. When he appeared before the Society on the last occasion, there was a considerable body of opinion which inclined to the view that it was impossible to construct any index of business activity, and he therefore welcomed the implication of Dr. Rhodes's paper that such a thing could be done.

He had three objections to the way in which Dr. Rhodes had constructed his weights. The first one arose out of the fact that Dr. Rhodes seemed to him deliberately to have ignored the nature of the material with which he was working. One of his conclusions was that the index of building activity was a very good measure of the whole index of business activity. Mathematically that was doubtless so, but he would hesitate a very long time before he reposed any particular confidence in that individual index, for the reason that as an index not of *business* activity, but of *building* activity alone, it was a most imperfect one. The figures were of plans approved by local authorities. The plan passed was not the same thing as the building erected. The plan passed might never eventuate in the building. The relationship of the value of the plans passed and the value of the buildings erected might vary considerably. The index was calculated from figures returned by local authorities in, he thought, 146 localities only; those localities omit London and Wales, and cover only some two-thirds of the localities outside. It was a little venturesome to build any substantial conclusion upon that index, and if in fact it reflected business activity fairly well, that was very largely an accidental result.

The second objection was one that Dr. Bowley touched upon —that Dr. Rhodes's analysis dealt entirely with the past. The indices that he indicated as those deserving the greatest weights were those which had happened to be the best from his point of view in the past few years, and there was no security that that would be so in the future. Dr. Rhodes chided himself a little for venturing to extrapolate for the next few months from the results of past years. But with an index which had to be published month by month this was a constant necessity, and they must be careful not to use weights which were going to get out of date and which would distort the index merely because they applied to a period past.

Mr. Crowther's third objection went deeper. He ventured to question the whole hypothesis on which Dr. Rhodes had based his paper. Broadly speaking, he thought it could be said that his method was to find out which of the indices had the greatest "conformity" to the final result. Was that really what one wanted to find out? Was it really the criterion on which a constituent series should be given the highest weight?

With reference to Dr. Rhodes's four favourite series, employment was obviously a very good indication of business activity in general, and that was why it had been given a heavy weight, but taking the other three, the reason they came out best from Dr. Rhodes's point of view was because they were all slow-moving indices. Commercial vehicles was an index of the total number of commercial vehicles in use, and the current output was only a small fraction of the total. Consumption of electricity was, by its nature, a slow-moving index, and the index of building activity was a twelve months' moving average. As the final composite index must be a heavy, slow-moving, unerratic curve, these three were naturally those that had a high measure of conformity, but it was a conformity which arose by mathematical accident and not out of the nature of the things measured.

To give an illustration of his objection to this method of determining weights, let it be supposed that there was a meeting of a Cabinet of twenty members, and that on an attempt to ascertain the opinion of the Cabinet, the voting was 19–1. Suppose further that the one dissentient was a man of great experience of affairs and of great wisdom in council. Should it be said that not only was he to be out-voted, but also, because he disagreed, he was only to be given half a vote? That was very nearly what Dr. Rhodes was doing. The application was, of course, to indices such as coal consumption, which should not be penalised because of their lack of conformity.

There was another objection against the tentative suggestion towards the end of the paper, that the same result could be achieved by taking 4 series only as by taking the whole 14. The difficulty about that—and Mr. Crowther here spoke with some hesitation because it did not appear in the months Dr. Rhodes took for his example—was that each one of these 4 series was liable to suffer from certain upsets peculiar to itself. If we had 14 series these individual eccentricities would probably not affect the final index, but if you had only 4, they might influence the index.

The problem of the *Economist* was to prepare an index which was to appear once a month, and to say not merely what the trend had been over the two years as a whole, but what it had been last month, and it was impossible to trust a small number of indices unless one could be certain that each of them was going to be removed from the possibility of quite arbitrary fluctuations.

He entirely agreed with Dr. Rhodes that in the construction of this index of business activity they had perhaps been a little unscientific; that was a confession that came to him quite easily because in the rush and press of journalistic work it was almost inevitable. But Dr. Rhodes had been, for their purposes, altogether too scientific. When Dr. Bowley was paying his well-merited tribute to the amount of labour involved in Dr. Rhodes's calculations, he (Mr. Crowther) wondered if it was suggested that they should calculate all these correlations every month between the appearance of the figures and press time. If so, they would certainly need Dr. Rhodes's help even more than at present.

Mr. Crowther said that his criticisms had been rather severe, but he would like to finish by saying what great assistance Dr. Rhodes had given, and what a help it was to have criticisms, comments and suggestions. The index had already been improved as a result of criticisms from Fellows of the Royal Statistical Society, both at the time he had read his paper and since, and any further assistance given would be welcomed—particularly the assistance of Dr. Rhodes. He was still unrepentantly of the belief that in assigning weights to the constituent elements there was no final criterion other than common sense. A number of elements must be taken into account; one of them, but one only, was this question of conformity, and in looking over their weights at the next revision to see whether they had adequately allowed for this factor of conformity, Dr. Rhodes's paper would be of the greatest assistance.

Dr. Irwin said he had been greatly interested in the paper because, as had already been emphasized, it was, apart from some earlier work by Dr. Rhodes himself, the first time that factor analysis had made an appearance in economics. Before that it had been the happy hunting-ground, or perhaps one ought to say the preserve, of psychologists and statisticians interested in the work of psychologists. The work of Professor Spearman had already been emphasized by previous speakers, and needed no emphasis from him; but there was one aspect of the subject to which he would like to refer, and that was the question of the uniqueness of the solution obtained. This question had already been thoroughly considered by a number of people, such as Garnett, Heywood, Piaggio and others, of which perhaps Heywood's discussion in the *Proceedings of the Royal Society* was the most rigorous.

Before coming to the consideration of this point, he would like, at this late hour, to plead with Dr. Rhodes to consider whether he could not change his notation. He used I for what factor analysts had always been in the habit of calling g, and he used G for a group factor; while the factor analysts had always used i for the indeterminate part of g.

One of the difficulties of, and criticisms urged against, Spearman's technique is that he was trying to express, say, r constituent series in terms of $r + 1$ other elements, viz. a single general factor and r specific factors or residuals, and the position there was rather similar to what the position would be if you were trying to obtain $r + 1$ quantities from r equations; there would be an indeterminacy in the solution; the result could be got out in more than one way.

Dr. Irwin said he would like to consider Dr. Rhodes' fundamental equation in paragraph 11. After a little manipulation of the right hand the equation could be expressed in the form

$$\frac{i}{\sqrt{\frac{Si^2}{n}}} = \frac{\left(\frac{x}{\sigma X}\right)\frac{r_{xi}}{1-r_{xi}^2}+\ \cdots}{\frac{r_{xi}^2}{1-r_{xi}^2}+\ \cdots}$$

where σX is the S.D. of the series X, and r_{xi} the correlation coefficient between X and I.

In this form its relation to the ordinary estimate of the general factor used by the factor analysts was fairly clear. Translating it into the ordinary notation of factor analysis, it would come to:

$$g = \frac{\Sigma\left(\frac{ar_{ag}}{1-r_{ag}^2}\right)}{S}$$

where $$S = \Sigma\{r_{ag}^2/(1-r_{ag}^2)\}$$

It would therefore seem that there was a slight inconsistency in the estimate, because if one squared the left-hand side and averaged the monthly values, the result would be unity, whereas if the same thing were done on the right hand, this would not be so. The result would be $(S+1)/S$. As a matter of fact, this was not quite the estimate which the factor analysts generally used; they used

$$g = \frac{1}{1+S}\Sigma\left(\frac{ar_{ag}}{1-r_{ag}^2}\right) + \frac{i}{(1+S)^{\frac{1}{2}}}$$

The numerators were the same, so that Dr. Rhodes's weights were unaffected; but, in addition to Dr. Rhodes's estimate, there was the other term $i/(1+S)^{\frac{1}{2}}$. This represented the indeterminate portion of the estimate, and i could be given n random values for n months as long as the standard deviation remained unity. The inconsistency in Dr. Rhodes's estimate probably arose from assuming the normality of the distribution of a finite number of residuals and applying the method of maximum likelihood, but was unimportant, since it gave the right weights. The indeterminacy, however, affected the uniqueness of the index obtained, and the question was how serious was this indeterminacy? If we supposed all intercorrelations between the separate series to be 0·5, so that $r_{ag}^2 = r_{ab} = 0{\cdot}5$, we have $S = 14$, so that the variance of the indeterminate portion still remained about 7 per cent. of the whole.

It would appear that it would be possible to construct not one index of business activity on these principles, but quite a large number, which would not differ very much from one another—which was the right one was a matter for the economists to decide.

Dr. Irwin said he had not considered the question of group factors very deeply, but he suspected that it was quite possible that one might be able to invent more than one system of group factors that would satisfy the required conditions. These again probably would not differ very much in the final index produced, but the theoretical point was there.

MR. NORMAN CRUMP said he would like to begin by congratulating Dr. Rhodes on the enormous amount of labour he had put into the paper. He knew a little of what that work meant in practice. He would also like to congratulate him on the interesting results achieved.

Like Mr. Crowther, he spoke entirely in his private capacity—perhaps even more so—and he would like to congratulate Dr. Rhodes, and, indeed, the Society generally, on having stimulated one of the most interesting discussions which he had had the good fortune to listen to during his sixteen or eighteen years' Fellowship of the Society.

Before Mr. Crowther got up to make the speech of the Counsel for the Defence, Mr. Crump had the feeling that they might be following the procedure laid down in the famous criminal prosecution *Rex* (or perhaps he should say *Regina*) *v.* the Knave of Hearts. It was not so much a case of "sentence first—verdict afterwards," as that they were being asked to consider their verdict before they had heard the defence. After Mr. Crowther had sat down, however, it was obvious that they had before them the theoretical mathematicians on the one side and the practical, hard-boiled economists and journalists on the other side, and that for once in a way both parties had found a common battleground on which they could meet. In any case, it was not entirely true to say that Dr. Rhodes presented only the case for the prosecution, because having built up a formidable indictment on the first 35 pages of his paper, Dr. Rhodes proceeded to demolish them completely on p. 36. On that page he at last recognized a point which had been worrying Mr. Crump for the whole of the first few pages—namely, that Dr. Rhodes was basing arguments he was dealing with on 1931–35, which was far too short a period. When he came to trace building activity, 1931–35 was unrepresentative as well as short, for it coincided with the growth of the building boom. On p. 36, however, Dr. Rhodes recognized that, and by the time he had got to paragraphs 48 and 49, he had made so many admissions that there was really very little left of what he had said before. All said and done, from the point of view of the mathematician and economist, four years was far too short a period from which to arrive at any definite conclusion.

There were also practical questions, when it came to calculating and publishing an index number for the benefit of the public. If the sole need was to assist and convince Fellows of the Society, then the task could be carried out in one way. Quite different methods were needed when dealing with the ordinary lay unmathematical public who took in the *Economist*, who used the index and who tried to follow it. If only 4 items were put into the index, not one reader in ten would accept the results as worth anything. It was necessary to put in a sufficient number of items to convince people that the whole ground was being covered, and the whole picture being presented. Again, 4 out of the 16 items might have been important in 1931–35, but for the period 1935–39 another 4 might come to the front. Obviously it was necessary to keep the composition of the index number more or less consistent over long periods, with only minor revisions such as people would understand without losing confidence. That was one reason why a large number of constituents had to be used, and rough-and-ready *ad hoc* weights.

Finally, Dr. Rhodes, with all his exhaustive work, had in the end got very close to the results produced by the *Economist* by what he described as rather rough-and-ready methods. Mr. Crump would like to ask Dr. Rhodes whether if he carried on along his lines, and they of the *Economist* along theirs, he would guarantee to get as close to them during the years 1936, 1937, 1938 and 1939? If he would, well and good; but if not, Mr. Crump, for one, was unrepentant in his support for the Counsel for the Defence. He recognized the work Dr. Rhodes had put in, and the contributions he had made, but in return, he invited him to recognize that the *Economist* had to deal with the matter from a practical journalistic point of view, and had to take other things into account. In conclusion, he had much pleasure in supporting the vote of thanks to Dr. Rhodes.

MR. YATES said that as a mathematician he would like to add a word in defence of Mr. Crowther's method of constructing indices.

In dealing with such indices he thought it was absolutely essential to start by considering what it was that the index was meant to do. In the case of an index of business activity, it appeared to him (and he thought Mr. Crowther and the other practical economists agreed with him) that what was wanted was a single number which should represent the sum of all the components of activity in the various branches of commerce and industry. Such component parts might vary independently, or might all be functions of the same variable. In the former case the relevant weights to assign to indices of the component parts would depend primarily on their relative importance in the whole complex of economic activity, and only secondarily on the errors to which they were subject. In the latter case, if the indices of the component parts were subject to error, they would arrive at Dr. Rhodes's general factor, or something very like it.

To take a specific example, the construction of an index of agricultural production in a state might be considered, it being supposed that there were reliable statistics of the production of the various crops and livestock products. A statistician would be confronted, just as in the present case, by a series of figures stretching over the course of years, but he would not be justified in merely looking for a general factor. Indeed, in so far as the figures could be considered reliable and free from error, his problem would be merely that of adding the various figures, after reducing them to some agreed standard, monetary or other. In so far as the figures were liable to error or were in the nature of overlapping statistics, two or more of which included the same component of production, further judgment would be required, and it might even be profitable to resort in certain cases to more refined statistical methods, but they would assuredly not be those which Dr. Rhodes had used.

Dr. Rhodes's methods might in such cases give misleading results. If, for example, wheat production went up, the production of beef might go down, because there was more land under the plough. Thus the wheat and beef indices might be negatively correlated in such a case. One or other would then achieve a negative weight under Dr. Rhodes's treatment.

A further mathematical defect of the present analysis was the failure to take account of or eliminate the correlation between neighbouring values of the component indices. Even in long-time series there were frequently considerable correlations between neighbouring values. In this case monthly intervals over a very short period had been taken, and some of the indices were actually themselves moving averages based on more variable monthly figures! Thus the assumption that the values were independently distributed could not be even approximately justified. The results might be very different if the same number of values—but separated by six-monthly intervals—had been taken over all the years since the war.

DR. NEYMAN: With all my great respect for Dr. Rhodes and Professor Bowley, I am afraid I disagree with the paper read to us to-night. I think that the problem of determining the business activity index in a purely empirical way, as it has been attempted by Dr. Rhodes, could not be solved at all.

Dr. Rhodes starts by assuming that several measurable quantities (indices actually calculated) $X, Y, Z, U, V \ldots$ are linearly connected with several other quantities I, G, H, X', Y', Z', called factors, which we should like to know what they are, but which we actually do not know. One of these factors—namely, the business activity index—is involved in all the observable variables from X to V, while others may be either group factors or special factors, affecting several or only one single variable. The factors are assumed to be statistically independent and some of them—normally distributed.

It will be convenient to call the equations connecting the observable variables with the directly non-measurable factors, *e.g.*

$$\left.\begin{array}{l} X = r_xI + g_xG + X' \\ Y = r_yI + g_yG + Y' \\ Z = r_zI \qquad\quad\; + Z' \\ U = r_uI \qquad\qquad\qquad\quad + h_uH + U' \\ V = r_vI \qquad\qquad\qquad\quad + h_vH + V' \end{array}\right\} \quad . \quad . \quad . \quad (1)$$

the structural equations. These structural equations play an important part in the theory given by Dr. Rhodes. They are assumed to correspond to some realities and the variables in the right-hand side, $I, G, H, X', Y', Z', U', V'$, must represent something real, though we do not actually know what it is. Our knowledge is strictly limited to the variables in the left-hand side of the equations (1), the particular values of which are observed at a series of moments and recorded.

The first problem of Dr. Rhodes consists in using the observed values of $X, Y \ldots V$, in order to determine both the pattern of the structural equations (1) and also the coefficients r, g and h. It will be noticed that the pattern of the structural relations may vary within broad limits. For example, the structure of the five variables considered may involve factors affecting certain groups of three or even four of them.

When the problem of structural relations is already solved, Dr. Rhodes proceeds to his second step. This consists in calculating such linear functions of observable variables which could be expressed in terms of the general factor, I, and one only of the remaining ones as follows:

$$\begin{aligned} f_1(X, Y \ldots V) &= A_1X + B_1Y + C_1Z + D_1U + E_1V \\ &\left.\begin{aligned} &= \alpha_1 I + \beta_1 X' \\ f_2(X, Y \ldots V) = \qquad\qquad &= \alpha_2 I + \beta_2 Y' \end{aligned}\right\} \quad (2) \end{aligned}$$

etc., so that the special factor like X' involved in one equation does not appear in others. These equations are called subsidiary.

When the subsidiary equations are obtained, then Dr. Rhodes gives the method of using them in order to calculate the most probable values of the general factor = index of business activity, for every moment where the values of $X, Y \ldots V$ are known.

My criticism concerns both steps of the theory described:

(*a*) The knowledge of the observed values of $X, Y \ldots V$ is, in my opinion, generally insufficient to determine both the pattern and the coefficients of the structural equations (1) and

(*b*) The real structural relations may be so complex that it will be impossible to deduce from them the subsidiary equations (2).

This last point is of minor importance, and is easily explained. Starting the study of a number of observable variables and having no *a priori* knowledge of the structural equations, we must assume that they are of the most general type. With five observable variables, this would involve the assumption of

1 general factor.
5 special factors each affecting only 1 variable.
10 group factors each affecting only 2 variables.
10 ,, ,, ,, ,, 3 ,,
5 ,, ,, ,, ,, 4 ,,

Total 31 factors.

Now, the calculation of the subsidiary equations (2) means in fact the elimination 31 − 6 = 25 factors which may be involved in the structural equations. This, of course, is not always possible. Indeed, it is possible only in exceptional cases.

But my main point is that the purely empirical method advanced by Dr. Rhodes is insufficient for the determination of the structural equations. Moreover, I think it to be highly probable that any other method which could be devised, if it is purely empirical, will prove equally inefficient.

Admitting, with Dr. Rhodes, that the structural equations like his own in paragraph 3 correspond to some realities, I assume that in some three countries A, B and C, the real structure of certain three observable variables X, Y and Z is as given below:

$$A$$

$$\left.\begin{aligned} X &= \xi + x' \\ Y &= \xi + y' \\ Z &= \xi + z' \end{aligned}\right\} \quad (3)$$

$$B$$

$$\left.\begin{aligned} X &= \tfrac{1}{2}\sqrt{3}\xi + \tfrac{1}{2}\sqrt{5}x' \\ Y &= \frac{1}{2\sqrt{3}}\xi + \frac{3}{2\sqrt{5}}x' + \sqrt{\frac{22}{15}}y' \\ Z &= \frac{2}{\sqrt{3}}\xi \qquad\qquad\quad + \sqrt{\frac{10}{33}}y' + \frac{2}{\sqrt{11}}z' \end{aligned}\right\} \quad (4)$$

$$C$$

$$\left.\begin{aligned} X &= x' + y' \\ Y &= x' \qquad + z' \\ Z &= \qquad y' + z' \end{aligned}\right\} \quad (5)$$

where ξ, x', y' and z' are directly non-observable factors, which I assume to be measured from their respective means in terms of their respective S.D.'s. It is obvious that this does not present any limitation. Following Dr. Rhodes, I shall also assume that all the factors are mutually independent.

It will be seen that in countries A and B the variables X, Y and Z do depend on a general factor ξ. This, however, does not exist in the country C, where the connections between X, Y and Z are due to group factors only.

If these equations were known, then we could follow the indications of Dr. Rhodes in calculating the approximate values of the common factor. For the country A we should apply the method explained in paragraph 8 and paragraph 11. This would lead to the equation

$$\xi = \lambda(X + Y + Z) \quad . \quad . \quad . \quad . \quad . \quad (6)$$

λ being a numerical constant.

For the country B the hypothetical structural equations correspond to what Dr. Rhodes gives in his paragraph 25 for the case of four variables. Accordingly, further calculations should follow the lines as in paragraphs 26 and 27. These lead to the following equation

$$\xi = \mu(X - Y + 2Z) \quad . \quad . \quad . \quad . \quad . \quad (7)$$

where μ is some constant factor.

For the country C the calculation of the values of the common factor would be impossible, since this factor does not exist at all.

This is the true state of affairs in the three countries which we could find out if the true structural equations were known. It will be noticed that the situations prevailing in A, B and C are very different.

Now, it is easy to see that the method of Dr. Rhodes could not possibly distinguish between the hypothetical situations in the countries A, B and C. For this purpose we notice that in each of the three different situations A, B and C the true variances of X, Y and Z

$$\sigma_x^2 = \sigma_y^2 = \sigma_z^2 = 2 \quad . \quad . \quad . \quad . \quad . \quad (8)$$

and that the true product moments, say

$$p_{xy} = p_{xz} = p_{yz} = 1 \quad . \quad . \quad . \quad . \quad . \quad (9)$$

When I say true variances and true product moments, I mean their values which could be obtained if an infinite number of observations were available. In practice, of course, we could not get the true values, but the values we are able to obtain differ from the true ones only by the random errors—this whether the factors ξ, x', y' and z' are normally distributed or not.

Let us now follow the method suggested by Dr. Rhodes step by step, and see what could be the results of its application to the data from the three countries, in the ideal case where these would not be obscured by the random sampling errors. Starting with the simplest scheme of paragraphs 8 and 9, where it is assumed that

$$X - \bar{X} = x = r_x\xi + x', \; Y - \bar{Y} = y = r_y\xi + y',$$
$$Z - \bar{Z} = z = r_z\xi + z' \quad . \quad . \quad (10)$$

we would calculate $S(xy)$, $S(xz)$, and $S(yz)$, which, apart from the random error, would give us, equally for all three countries,

$$S(xy) = S(xz) = S(yz) = np_{xy} = np_{xz} = np_{yz} = n$$
$$= R_xR_y = R_xR_z = R_yR_z \quad . \quad . \quad . \quad (11)$$

where n denotes the number of equations.

To calculate the R's it will not be necessary to apply the method of least squares, and we could get exactly

$$R_x = \sqrt{\frac{np_{xy}p_{xz}}{p_{yz}}} = \sqrt{n} \quad . \quad . \quad . \quad . \quad (12)$$

and similarly $R_y = R_z = \sqrt{n}$. It is seen that the R's are functions of the product moments of the observable variables only, and that therefore, so long as in the three countries the true product moments are respectively equal, the R's calculated for these countries will differ by the random errors only.

The same applies to the estimated variances of the residuals. Following paragraph 10 we calculate $S(x^2)$, $S(y^2)$ and $S(z^2)$. Apart from a random error, we get the result, the same for all countries, A, B and C,

$$S(x^2) = n\sigma_x^2 = 2n \quad . \quad . \quad . \quad . \quad . \quad (13)$$

and similarly $S(y^2) = S(z^2) = 2n$ owing to (8).

Now, Dr. Rhodes's $S(x'^2)$ (see paragraph 10) is

$$S(x'^2) = S(x^2) - R_x^2 = n \quad . \quad . \quad . \quad . \quad (14)$$

and according to paragraph 11, $\sigma_x^2 = 1$. Similarly $\sigma_y^2 = \sigma_z^2 = 1$. In my formulæ (3) and (4), I have denoted by ξ the true common factor influencing X, Y and Z. Now, I shall use the letter i to denote the estimate of the common factor obtained by the method of Dr. Rhodes. Following paragraph 11, the first approximation to the values of i would be given by

$$\frac{i_t}{\sqrt{S(i^2)}} = \frac{x_t \dfrac{R_x}{S(x'^2)} + y_t \dfrac{R_y}{S(y'^2)} + z_t \dfrac{R_z}{S(z'^2)}}{\dfrac{R_x^2}{S(x'^2)} + \dfrac{R_y^2}{S(y'^2)} + \dfrac{R_z^2}{S(z'^2)}}$$

$$= a_1x_t + b_1y_t + c_1z_t \qquad \text{(say)} \quad . \quad . \quad . \quad (15)$$

where a_1, b_1 and c_1 are known functions of the variances and the product moments of the observable variables only. Apart from the random errors, this would give for all the three hypothetical countries the same equation, namely

$$\frac{i_t}{\sqrt{S(i^2)}} = \frac{1}{3\sqrt{n}}(x_t + y_t + z_t) \quad . \quad . \quad . \quad (16)$$

This we have to consider as a first approximation. The next approximation is obtained by calculating new values for the R's. *E.g.* the new value of R_x—say $R_x^{(1)}$—is obtained by multiplying (15) by $x = X - \bar{X}$ and summing. It will be noticed that again the result is a function of the variances and the product moments of the original variables X, Y and Z, which it is easy to calculate without actually calculating the separate values of i. In fact

$$R_x^{(1)} = S[x_t(a_1x_t + b_1y_t + c_1z_t)] \quad . \quad . \quad . \quad (17)$$

and since a_1, b_1 and c_1 depend only on the variances and the product moments of the observable variables, the same is true for $R_x^{(1)}$, $R_y^{(1)}$ and $R_z^{(1)}$. The same will also apply to new estimates of the variances of the residuals σ_x^2, σ_y^2, σ_z^2, and the new formula, giving the second approximation to the values of i, viz.

$$\frac{i_t}{\sqrt{S(i^2)}} = a_2x_t + b_2y_t + c_2z_t \quad . \quad . \quad . \quad . \quad (18)$$

will have coefficients a_2, b_2 and c_2 depending in a known way solely upon the product moments and the variances of X, Y and Z. Thus, apart from random errors, it will be for all the three countries the same.

It is clear that the same argument applies to any order of approximation described in paragraphs 12 and 13.

Before considering any particular approximation, say,

$$\frac{i_t}{\sqrt{S(i^2)}} = ax_t + by_t + cz_t \quad . \quad . \quad . \quad . \quad (19)$$

as finite and satisfactory, Dr. Rhodes attempts to test whether his assumptions concerning the mutual independence of residuals is justified. The process is described in paragraph 14 and illustrated in paragraph 18. It consists in calculating separate values of i_t for each t, in substituting i_t in (10) for ξ and in correlating the estimated values of the residuals.

$$\left.\begin{aligned} x_t' &= x_t - r_x i_t = x_t - R_x \frac{i_t}{\sqrt{S(i^2)}} \\ y_t' &= y_t - r_y i_t = y_t - R_y \frac{i_t}{\sqrt{S(i^2)}} \\ z_t' &= z_t - r_z i_t = z_t - R_z \frac{i_t}{\sqrt{S(i^2)}} \end{aligned}\right\} \quad . \quad . \quad (20)$$

If I understand Dr. Rhodes correctly, the smallness of correlations should be considered as an indication that both the hypothesis concerning the pattern of the structural equations was correct and that the approximation attained by formula (19) is satisfactory. Otherwise he would proceed to further steps explained in paragraphs 21 and 22.

It may be shown: (1) that the test of the hypothesis described depends only on the variances and the product moments of the original variables X, Y and Z, and (2) that the existence of correlations between the residuals (20) is not necessarily an indication that the assumed pattern (10) of structural formulæ was wrong.

The first point is apparent from the following formulæ obtainable from (19) and (20)

$$\left.\begin{aligned} x_t' &= (1 - aR_x)x_t - bR_x y_t - cR_x z_t \\ y_t' &= - aR_y x_t + (1 - bR_y)y_t - cR_y z_t \\ z_t' &= - aR_z x_t - bR_z y_t + (1 - CR_z)z_t \end{aligned}\right\} \quad . \quad . \quad (21)$$

To calculate the product moments of x_t', y_t' and z_t' we have to multiply pairs of the formulæ (21), to sum up the products for all t's and to divide by n. The results will depend on the R's, a, b, c and on the variances and product moments of the original variables. The same is true for the S.D.'s of x', y' and z'. As it was found before that a, b, c and the R's do not depend on anything else but the variances and the product moments of X, Y and Z, it follows that my statement (1) is correct and that, incidentally, it is not necessary to calculate the individual values of the residuals in order to calculate their correlations. It follows also that the check of Dr. Rhodes, if applied to the data from my three hypothetical countries, apart from random errors, would lead to identical conclusions.

In order to prove my statement (2), consider what should be the correlations between the residuals (20) or (21) for the country A in which the structural equations correspond exactly to the hypothesis assumed.

Substituting in (21) the true values of the R's, all equal to $\sqrt{n}$ and using the equation (16) for i_t, not involving any random error, we would get

$$\left.\begin{aligned} x_t' &= \tfrac{1}{3}(2x_t - y_t - z_t) \\ y_t' &= \tfrac{1}{3}(- x_t + 2y_t - z_t) \\ z_t' &= \tfrac{1}{3}(- x_t - y_t + 2z_t) \end{aligned}\right\} \quad . \quad . \quad . \quad . \quad (22)$$

and, remembering that the variances x_t, y_t and z_t are all equal to 2, while their true product moments are all equal to 1, it is easy to calculate that the correlations between any pair of residuals are equal to $-\frac{1}{2}$. Thus the assumed pattern of the structural equations, viz. $x = r_x i + x'$, etc., may be correct, as it is in the case of the hypothetical country A, and the residuals x', y' and z', as calculated by the method of Dr. Rhodes, may have the correlations as high as $-0{\cdot}5$! Of course, the same correlations will prevail in the countries B and C.

If we go further and follow the indications of paragraphs 20 and 21, we shall find that the constants p and p', designed to determine the final shape of the structural equations, depend on variances and the product moments of the residuals x', y' and z' previously calculated, as in my formulæ (21). We have already seen that these are determined by the product moments and variances of the original variates. It follows that the whole method advanced by Dr. Rhodes is based entirely on the constants of these two kinds, and that therefore, as far as in any two situations as in my hypothetical countries the variances and the product moments of the observable variables are the same, the method would give the same result. This, however, may, and probably always will, have no relation to the actual state of affairs. It will be noticed that the above conclusion does not in any way depend upon the assumption of the factors being normally distributed. But if they are in fact normal, then so will be the distribution of the observable variables, and it will be totally determined by the variances and product moments. In such a case there will be absolutely no means of distinguishing between the countries A, B and C. If the factors are not normally distributed, then there may be some means of finding out empirically what the structural equations are, but the corresponding method must use higher moments and product moments of the variables that we observe. I doubt, however, whether such a purely empirical method could be devised. I have the impression that if the structure of the observable variables can be found at all, it must be by some method based on economic considerations determining *a priori* the pattern of the structural equations and the character of the factors involved. Next, the economic analysis of the situation in a given country may discover that in certain periods some particular factors were perhaps less variable than in others. This *a priori* information, combined with the empirical data, could be perhaps sufficient to determine the structure of the variables.

The following simple example shows that the above conclusions do not depend upon the assumption that the number of the observable variables is 3 only.

$$\begin{array}{ll} \text{A} \\ X = \sqrt{2}\xi + x' \\ Y = \sqrt{2}\xi + y' \\ Z = \sqrt{2}\xi + z' \\ U = \sqrt{2}\xi + u' \end{array} \qquad\qquad \begin{array}{l} \text{B} \\ X = \phantom{x' +{}} y' + z' + u' \\ Y = x' \phantom{{}+ y'} + z' + u' \\ Z = x' + y' \phantom{{}+ z'} + u' \\ U = x' + y' + z' \end{array}$$

where ξ, x', y', z' and u' are assumed to be independent and varying about zero, with S.D.'s equal to 1. Here again the variances and the product moments are, in both cases, the same, while the structure is very different.

Similar examples have been produced in the past by Thomson.* I take the liberty of discussing them here at length because both the paper of Dr. Rhodes and the discussion which followed seem to indicate that their bearing on the problem of the business activity index is not fully recognized.

MR. ELLINGER imagined that the mathematicians would go home that evening and say, "This is the end of a perfect day," but he wanted to put in one word as a plea for the poor ordinary ignorant business man who had to look at his *Economist* and make such use as he could of the guidance he received from the index number of business activity. If the business man did not know what the index number meant, it was no use to him. He had to turn his mind back to 1934 and look at the warnings in the *Economist*, which told him that it did not take into consideration the growth of population, had nothing to do with the prosperity of industry, for it ignored profits and earnings, and he must remember that it was a volume index, and not a value index. When he had done that, he began to think that he understood a little bit more of what it meant. If Dr. Rhodes had arrived at some entirely different results from the *Economist* index number, as a business man he would say that it must be left to the *Economist* and Dr. Rhodes to fight it out together, but if by different methods they could arrive at approximately the same result, then they could take into consideration the business man, and the conviction that was brought to his mind; the index number must not only be scientific, but to serve any practical purpose must carry conviction to the business man. The business man would not place the same reliance upon an index number with only four series as he did on the fourteen series of the *Economist*. Again, if he were told that approximately the same weight was to be given to motor registration as was given to employment, he would lose confidence in the index number. If the index number as constructed by Dr. Rhodes was going to come out the same as that constructed by Mr. Crowther, then he would ask Mr. Crowther to continue to give his index number, and business men could continue to use it with confidence.

MR. GLENDAY sent the following contribution after the meeting:—

I was greatly disappointed not to be able to be present to support in person Dr. Rhodes's able attack on the Indices of "General Business Activity." I am afraid I am unable to believe in that economic will-o'-the-wisp *the* trade cycle, the movements of which it is the purpose of these indices to measure. I am, of course, aware that our economic system has suffered at irregular intervals in the course of its life-history from a number of abrupt interruptions in its rate of growth. But there is nothing surprising in this. A country which less than 150 years ago had a population of barely 8 millions, living in the main a simple agricultural life, to-day accommodates over 40 million people enjoying the benefits of such revolutionary inventions as the railway, the steamship, electricity, the motor-car, mass production, etc. Surely it would have been a matter for wonderment had all these things been achieved without interruption. Equally to be expected was the circumstance that whenever a hold-up occurred in an important part of the system, it affected the well-being of the whole. These are features common to all forms of growing organisms. Even in the case of our own bodies, we find, over the cycle of birth to death, many interruptions in the even tenor of development. But because it so happens that in the majority of cases these interruptions affect the well-being of the body as a whole, doctors do not attribute all diseases and functional disturbances to a mysterious something called *the* " health cycle "—and leave it at that.

---

* Godfrey H. Thomson, "Group Factors in School Subjects," *Brit. Journ. Educ. Psychology*, Vol. V, pp. 194–199, 1935.

My criticism, however, of the point of view of those who believe in the value of " General Indices of Business Activity " goes deeper. I hold that there are forces which help in shaping our economic destinies that are almost entirely overlooked by traditional economics. This deals in the main with what I may call primary laws—that is, the laws which govern the behaviour of individuals as individuals. There are, however, it is reasonable to suppose—as in the rest of nature—also laws which govern the behaviour of these individuals when they are arranged in economic systems, *i.e.* secondary laws. I may term this latter branch of the subject " field economics," to distinguish it from the former. It is concerned with the effect of changes in the " arrangements " of economic individuals and economic factors on the capacity of the system as a whole to deliver output.

May I illustrate how a change in " arrangement " can affect capacity for output by an example familiar to everyone—fluctuations in the harvest? It is possible for a given agricultural area to be planted each year in exactly the same way, and to receive exactly the same quantity of sunshine and the same quantity of rainfall, and yet one year to have a bumper harvest and the next a failure. This will depend on the *order* in which these component factors are " arranged," and not on their mere *quantitative* relations. The *same* economic factors arranged in a different way give a *different* result. A change in the basis of a country's system of agriculture will usually produce a long-term change of a similar kind; and a new wave of population growth will accompany the new wave of production growth.

Similar discontinuous " jumps " in output capacity occur in an industrial system or in a single industry whenever a favourable " re-arrangement " of the component factors is made. Unlike a harvest change, however, the changes in this case will usually be permanent and irreversible. The " jump " in output capacity, in this case, though equally abrupt in its first appearance, will take more time to reach its maximum pressure: *i.e.* years, as against months in the case of a harvest; this time will depend on the period of gestation of the new "arrangement." As an example of a basic alteration of this type, I may refer to the linking up with Europe of food-supplying areas like the Argentine in the nineteenth century, by means of the railway, steamship, and last, but not least, cold storage. Unless these three inventions (*i.e.* "rearrangements") had been made, and *in that order*, no cheap meat from Argentine could ever have reached this country. As it was, there was suddenly released a capacity for output which for many years had to be held in check while European consumers were being prepared, *i.e.*, "arranged" to absorb it. We might have invested ten times as much money and employed ten times as many people in our own domestic agricultural system over the period, without hope of producing a tithe of the result. To attempt to assess the effects of discontinuous "rearrangements" of this kind by indices composed of aggregates of the component factors, *e.g.* numbers employed, money invested, etc., is wholly to misconceive the nature of what is happening. It is like trying to compare two musical compositions by summations of the different kinds of notes in each, or to estimate the importance of the changes which occur in the human body at puberty or the menopause by a similar process of simple measurement. To suggest that properties should be found in a material complex which are *not* a summation of the properties of the components will, I know, seem strange to economists unversed in natural science. For it will seem like saying that you can produce something out of nothing. But what it really means is that certain of the properties of the components are not released except in combinations.

Now, all the important so-called "trade cycles" of the past have been accompanied by major "rearrangements" of the above kind. The present cycle, as we all know, is associated with "rearrangements" in the sections of our economic "activities" which cover housing and rearmament. It is on what happens in these items that will depend in the main the size and duration of the present boom. Broadly speaking, our house-building "arrangements" have been progressively adjusted to produce more and more houses in shorter and shorter periods of time. When the present *accelerated* building programme has been completed, either we shall have to provide a fresh building programme of a similar type *at a similar pressure*, or there will be a slump. The same applies to our rearmament plans, except that—as the war taught us—munition arrangements cannot readily be converted to peace-time uses, so that in this case a slump is inevitable unless—as Germany is doing to-day—we develop an export trade in munitions! At the moment our "arrangements" for this purpose are far from complete; indeed, the present position illustrates the nature of the rôle played by "arrangement" in economic affairs. A speeding up of our munitions production is impossible until and unless all sorts of rearrangements have been made *first*. Take the aeroplane side alone. New men must be taught aircraft manufacture—and an unemployed collier cannot be made into an air-mechanic in a day, if ever—pilots must be trained, aerodromes built, etc. These take time. Meanwhile, to seek to speed up aircraft output by spending more money would be worse than waste of time. The disbandment of thes "rearrangements" when our air programme is complete will be a even more difficult and prolonged process.

Sir William Beveridge's detailed analysis of the unemploymen statistics in the current issue of *Economica* provides an excellen illustration of some of the difficulties of "rearrangement," and als of the danger of using indices of components, *e.g.* the figures for *tota* unemployment, to compare the state of trade at different points o time, and in particular to estimate how far advanced we are in th boom of to-day.

Dr. Rhodes: I have been asked to reply in the *Journal*, but there is one point to which I would like to refer now. I would like to say something about the 1, 2, 3, 4 or 14 constituent elements used in calculating an index of this kind.

Some time ago when I was reading through the proof of this paper I re-read Mr. Crowther's paper of three years ago, and the comments which were made at the time, and I seem to remember that Sir George Paish spoke on that occasion, and I received the impression that he was in the habit of using one or two indices rather than fourteen when he was thinking of business activity. "I used to take railway earnings as my own barometer of trade for many years" (Sir George Paish, *J.R.S.S.*, 1934, p. 264).

On general grounds one is inclined to go for a large number of constituent items—14 is better than 4, and 114 would be better than 14. We have more confidence in the Board of Trade index of wholesale prices because they have more constituent items than the *Statist*. I really do not think there is a great deal in this. I think that if the *Economist* chose to sell an index which was based on three items, they would be able to sell it as well as they do an index based on fourteen. The Editors would naturally have to use arguments as convincing as those used three years ago. Thank you.

Dr. Rhodes's further reply was as follows:—

The ground covered in the discussion was very wide, and I will try to reply in what appears to me to be the most natural manner.

I appear to have been the target for certain brickbats possibly intended for others. I started with the assumption that the idea of an Index of Business Activity was accepted. The *Economist* is the parent, not I. I am merely a friendly relative. Prof. Spearman is the parent of "*g*". Dr. Neyman's devastating indictment is not really directed at me. Nevertheless I am willing to take a stand in defence of the idea of such indices as have been questioned in the discussion.

With regard to Dr. Neyman's point that no mathematical analysis can prove the existence of an Index of Business Activity, I agree. But I never pretended that it could. I start out with the assumption that this exists. That is, I assume that economists are prepared to accept such an idea and ask statisticians for a measure of it. This fits in with Dr. Neyman's principles. We may with further economic analysis be able to get "economic considerations determining *a priori* the pattern of the structural equations and the character of the factors involved" (Dr. Neyman). At present, the whole problem is in its infancy. Dr. Neyman illustrates alternative patterns :—

$$\begin{array}{ll} \text{A.} & \text{B.} \\ X = \sqrt{2}\xi + x' & X = y' + z' + u' \\ Y = \sqrt{2}\xi + y' & Y = z' + u' + x' \\ Z = \sqrt{2}\xi + z' & Z = u' + x' + y' \\ U = \sqrt{2}\xi + u' & U = x' + y' + z' \end{array}$$

which have the same variances and product sums of X, Y, Z, U. But we may write his pattern B as below :—

C.

$$\begin{aligned} X &= x' + y' + z' + u' - x' \\ Y &= x' + y' + z' + u' - y' \\ Z &= x' + y' + z' + u' - z' \\ U &= x' + y' + z' + u' - u'. \end{aligned}$$

C is really the same as A, except that ξ has now been split up into parts. I am concerned with pattern A rather than pattern C.

Mr. Yates refers to an Index of Agricultural Production as an aggregative of various crop and livestock products. My view of an Index of Business Activity is that it is not that kind of Index at all. His view is that it is, and that all that is required is to assign to the indices of the component parts the relevant weights, these being determined by the relative importance in the whole complex of economic activity of the components. This is what Mr. Crowther has done, but I do not see how the relative importance of Employment, Postal Receipts and Bank Clearings, for instance, in the whole complex of economic activity is to be determined. It is for this reason that I have tackled the problem from a different angle. Can Mr. Yates construct an index of Agricultural Activity, taking into account Land, Capital, Labour and Distribution, using his method? The analysis which I used takes no account of the *order* of the figures which are the data, and, of course, we may say that it is the very correlations between neighbouring values which we are anxious to measure. We want to know whether Activity is on the upgrade or not.

Dr. Irwin urges me to bring the notation I have used into line with that of the writers on Factorial Analysis. I deliberately used a different notation. I had in mind that the Fellows of our Society for the most part would not have any acquaintance with the work of the Educational Psychologists, and that those who had would recognize the similarity. But for my purposes there was no point in using "g" when what I wanted was more obviously "I," and so on. Moreover, the treatment I used was not entirely the same. The problems are somewhat different. The psychologist is probably more interested in his values of "r_{ag}", I am more interested in "I". Moreover, it has been pointed out, especially by Prof. Bowley, that my method of obtaining "I" differs from the accepted method of determining "g". I agree. Dr. Irwin has given a summary of the argument for the determination of "g" in the *Bulletin de l'Institut International de Statistique*, Tome XXVIII, 1935, pp. 192 *et seq.* Let us quote Dr. Irwin. $a, b, c, \ldots$ represent the performances in tests :—

$$\begin{aligned} a &= m_a g + n_a s_a \\ b &= m_b g + n_b s_b \\ c &= m_c g + n_c s_c \\ &\cdots \\ &\cdots \end{aligned}$$

where g and the s's are uncorrelated.

Choose multipliers $\omega_a, \omega_b, \ldots$ giving $t = \Sigma\omega_a \,.\, a$, and work out the correlation between g and t.

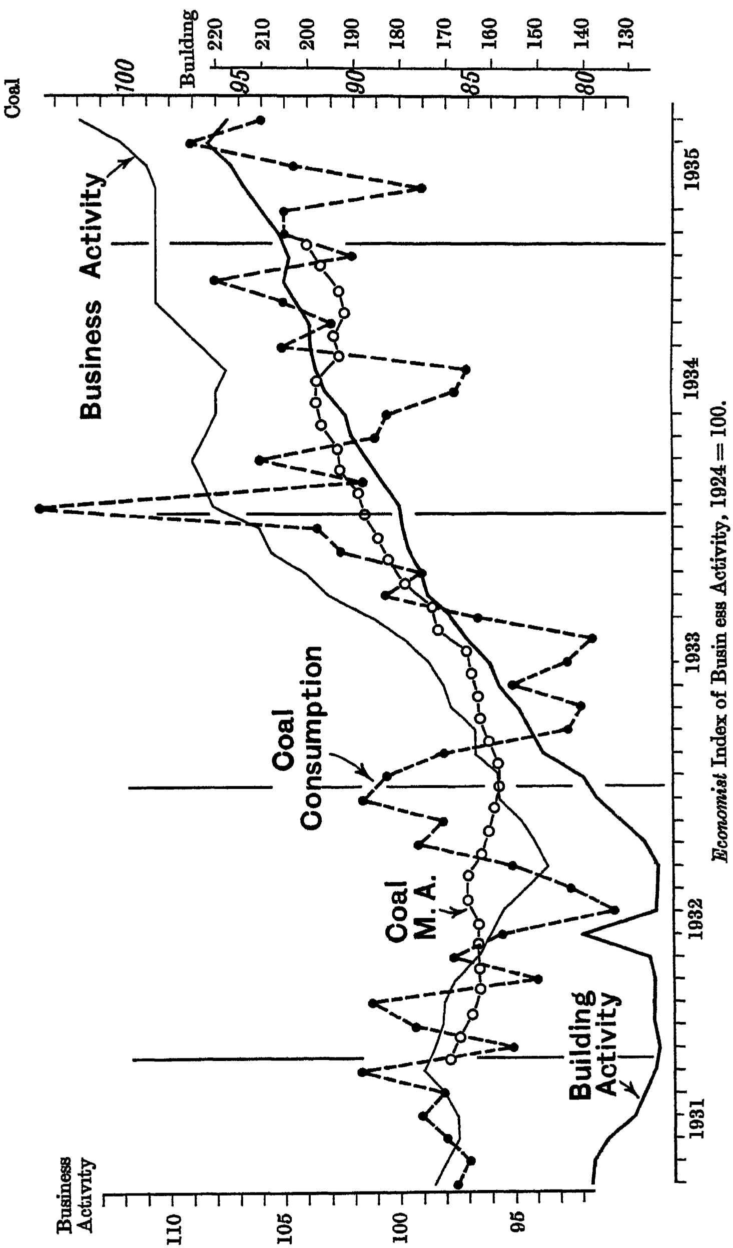
$$\gamma_{tg}\sigma_t = \Sigma\omega_a\gamma_{ag}\sigma_a.$$

The problem is to determine the multipliers ω_a which will make γ_{tg} a maximum. Why should we make γ_{tg} a maximum? In order that $\sigma_{g\,.\,t} = \sigma_g\sqrt{1 - \gamma^2_{tg}}$ should be a minimum. We come back to Least Squares and the Normal Curve. In the subsequent analysis, in order to find the ω's we have to assume certain relationships which are determined from the linear relations assumed above. To my mind, this is a roundabout method, and I prefer to go direct from these linear relations expressing $a, b, \ldots$ in terms of g, n_a, n_b, etc.

I am obliged to Dr. Isserlis for referring to another point in the analysis, viz. the difficulty of estimation of the R's from the data. In my method, I do not use, as final, values computed from the original equations, such as $R_x R_y = S(xy)$. My first object is to get good approximations, from which I can get estimates of i, whence I derive better approximations to the R's. In my view no simple solution giving "best" values of the R's is possible directly.

Prof. Bowley refers to the fact that in the analysis what emerges is a figure proportional to i, but not the Index itself. This is true. But it is always possible to get for any constituent that part which is due to "Business Activity." For instance, the part of x due to "Business Activity" is $r_x i = R_x \dfrac{i}{\sqrt{S(i)^2}}$.

So, if we desire to calculate i, we have to be content with figures which represent the effect of Business Activity in the different series. We can, if we choose, conventionally decide that a particular one of these shall represent the Index. In the illustration, which I gave showing the *Economist* Index for 1931–35 with mine, I took one which had roughly the same relative change as that of the *Economist*. If we suppose, as I do, that "Business Activity" is a common factor in the determination of the figures in a number of statistical series, and that this factor has no units and is unmeasurable, then any figure which we use to give an appreciation of it must depend on agreed conventions. First of all, we agree that a certain number of series are most likely to contain evidence of it, and if we choose to do so, we shall probably take as conventional measures figures



Economist Index of Business Activity, 1924 = 100.

which are more or less middle values of the constituents at any given time. But when we are interpreting such figures we should not be thinking in absolute terms, but relative.

With regard to the constitution of the 14 series used in the Index, my position is plain. I assume that it is agreed that these 14 series are the most important as pointers to Business Activity. I leave it to the economists to decide whether these are well-chosen or not. I am merely interested in the problem of how these should best be combined in order to get an estimate of the desired Index.

[With regard to Prof. Bowley's point as to paragraphs 15 and 19, the first values of R (paragraph 15) obtained are merely crude estimates, those given in paragraph 17 are more accurate. If we adopted the tetrad criterion to our data, we should be testing whether the product-sum-residuals were negligible having regard to the size of the R's, what we want is to test whether the product-sum-residuals are negligible compared with the size of the residuals themselves.]

Turning to Mr. Crowther's comments on the paper, he chides me with pointing out that in the period for which the figures were analysed the Building figure was a good indicator of the Business Activity figure. So it was. In the diagram attached are shown the *Economist* Index of Business Activity with the Index for Building Activity and the Index of Coal Consumption (with a 12-month moving average). I was merely concerned with presenting the facts. Mr. Crowther thinks that if Building Activity reflected Business Activity fairly well, this was very largely an accident; it was rather a series of accidents happening over 4 years. What I inferred was that any conclusions which Mr. Crowther drew in those 4 years from the Index of Business Activity could very well have been drawn from the Index of Building Activity. But if he really thinks that there is only an accidental connection between Building and Business, why does he use Building as a constituent item in his index?

It is true that we can only draw statistical conclusions by examining time-series which of necessity relate to the past, perhaps the immediate past. But, I also think that we might use this knowledge in the immediate future. This, of course, is commonplace, *e.g.* eliminating seasonal movements. If something happens to disturb the serenity of events, naturally we would hesitate. Incidentally, of course, Mr. Crowther is drawing on his knowledge of the past when he makes his own assessments of the weights to be used in combining the constituent items of the Index. Again, I am not one of those who think that we must have at least 500 observations before we can make any deductions.

If over a long period of time twenty Cabinet Ministers regularly voted 19–1, the minority vote being always that of a wise and experienced Victorian statesman, and if it were required to have an opinion of the policy of the present Cabinet, surely one would ascertain the views of one of the 19. If it were desirable to find out what the policy would have been if the Cabinet had consisted of persons eminent in Victorian days, then naturally one would ascertain the views of the minority voter. Actually, of course, what would happen is that if this statesman were consistently opposed to the majority, he would be given not half a vote, but no vote and, possibly, be given the Post of Steward of the Chiltern Hundreds. Why should not indices of coal consumption be penalized if in fact they do not reflect the trend of affairs? Why should persons think that such indices ought to reflect such changes in these days when masses of other statistical data are available?

There is a difference between using a slow-moving index which moves in the right direction and one which moves contrarywise. If the four series which emerge in my analysis as useful pointers are slow-moving in the right direction, all the better. Why complain? It is not a "mathematical accident." The facts are there. The Coal figures fluctuate month by month. Mr. Crowther uses these, and I merely analyse his figures. If he has any complaints as to slow-moving and quick-moving series, they should not be referred to me. I did not choose the constituent series.

It is obvious that I am not concerned with matters on which Mr. Crowther lays stress—the difficulties of a journalist. All I am concerned with is the method of construction of the Index. Mr. Crowther uses past experience to help him to decide how the constituent items should be combined in one way, I use past experience in another way. The point at issue is not that masses of calculations need be made every month, but whether the approach which I have made to the problem is an advance on Mr. Crowther's approach or not.

I do not agree with Mr. Crump that the period 1931–35 was too short. I am inclined to the view that the weights in such an index should properly be changed at comparatively short intervals if the facts warrant such a change. If it is recognized by Mr. Crump that 1931–35 "coincided with the growth of the building boom," why should he not accept the idea that Building Activity was one of the major effects of "Business Activity," and therefore accept the idea that the Building figure would be a useful representative, in that period, of Business Activity? It is absurd to say that 4 years is too short a period from which to arrive at any definite conclusions. On the contrary, if we wish to know what was happening in these 4 years we should examine data relating to that period and no other. That is all I have done and all I claim to have done. I do suggest, however, that such lessons as we learn from these 4 years might be useful for a short subsequent period, but this is to utter what everyone accepts.

I do not agree with Mr. Crump about the number of items. As I said at the meeting, if the *Economist* convincingly demonstrated that an index based on four items would give a satisfactory account of the state of affairs, the lay reader would accept the situation. There are many occasions when an Employment Index alone is used in this way. There is no magic in 4, 14 or 140. We must keep in mind also the levelling effect of the averaging process.

Suppose the country were in such a state that the business activity consisted of the distribution of goods sent from overseas in exchange for past services, the majority of the people being engaged in Golf and Gardening, would Mr. Ellinger think that an

Index of Business Activity which was determined by a combination of constituent items which gave motor vehicles approximately the same weight as employment a poor one? We have not arrived at such a state of affairs, but it certainly is true that in recent years there has been considerable activity in the distribution of goods by road. Let us admit the fact, and if data of this sort are available and do show movements simultaneous with those of Business Activity, let us give them their due importance in the near future in calculations of Indices of Business Activity.

As a result of the ballot taken during the meeting the candidates named below was elected Fellows of the Society:—

Norman Hall.
Albert Victor Martin.
Erwin Joseph Rawicz.

MISCELLANEA.

CONTENTS

PAGE
Comparison between Enumerated Census Populations and the Population Calculated from Recorded Births and Deaths at Ages under 5. By E. LEWIS-FANING, B.Sc.(Econ.) 67
The Efficiencies of the Binomial Series Tests of Significance of a Mean and of a Correlation Coefficient. By W. G. COCHRAN, B.A. 69
A New Calculation of the Poverty Line. By R. F. GEORGE 74
The Irish Free State Census of Distribution, 1933. By IRIS DOUGLAS ... 96
The Twenty-Third Session of the International Institute of Statistics, 1936. By A. L. BOWLEY, Sc.D., F.B.A. 100

COMPARISON BETWEEN ENUMERATED CENSUS POPULATIONS AND THE POPULATION CALCULATED FROM RECORDED BIRTHS AND DEATHS AT AGES UNDER 5.

By E. LEWIS-FANING, B.Sc.(Econ.)
(of the Medical Research Council's Statistical Staff).

MR. GEORGE KING in his account of the construction of English Life Table No. 8 (1910–12) drew attention to the discrepancy which existed at ages under two years between the numbers expected by survivorship from the recorded births and the actual numbers enumerated at the 1911 Census.* The figures he gave are (in thousands) as follows :—

	0.	1.	2.	3.	4.
			thousands		
Calculated survivors from registered births and deaths at middle of 1911	820	791	785	780	766
Enumerated at the 1911 Census and adjusted to mid-year	782	743	790	778	764
Difference	– 38	– 48	+ 5	– 2	– 2
Difference as percentage of enumerated	– 4·8	– 6·4	+ 0·6	less than 1%	

Of these deficiencies he remarks: " The conclusion seems inevitable that a large number of infants under two years of age escaped enumeration at both the Censuses of 1901 and 1911, more especially at 1911, although why that should be it is difficult to understand. Is there any other explanation ? This is a matter that is well worthy of investigation before the next Census comes to be taken."

---

* Supplement to the 75th Annual Report of the Registrar-General, Part I. Life Tables, pp. 12–13.

Actually no further reference was made to this small arithmetical curiosity of vanishing infants in subsequent reports on National Life Tables; no doubt because survivorship data alone were used in the construction of the early parts of the tables. But in the General Report on the Census of England and Wales, 1921 (pp. 76–8), the subject is discussed. A more elaborate method than that adopted by Mr. King was used, and it appeared that although the discrepancies between enumerated and survivors were reduced, they still existed. The shortage at ages under 1 (in thousands) was 24, and at ages 1–2, 22. The conclusion was reached that a tendency to state age at nearest birthday was not a complete explanation, and that there must still be a definite omission of young children. No doubt the subject will again be discussed officially. It is perhaps of some interest from the point of view of the unofficial user of data to ascertain what sort of a discrepancy the rigid application of King's simple method to the 1931 data would reveal. A rigid application of the method described by Mr. King to the 1931 data gives the following results :—

1931.	Ages.				
	0.	1.	2.	3.	4.
			thousands		
Calculated survivors from registered births and deaths at middle of 1931	605	599	596	599	611
Enumerated at the 1931 Census and adjusted to mid-year	599	589	593	593	611
Deficiency	— 6	— 10	— 3	— 6	0
Deficiency as percentage of enumerated	— 1·0	— 1·7	less than 1%		

It will be seen that there are still vanishing infants, but many fewer than twenty years before: a gratifying proof of the steadily increasing accuracy of our data.

THE EFFICIENCIES OF THE BINOMIAL SERIES TESTS OF SIGNIFICANCE OF A MEAN AND OF A CORRELATION COEFFICIENT.

By W. G. COCHRAN, B.A.

1. *Introduction.*

IN a preliminary survey of a set of data, one sometimes wishes to decide rapidly, without any elaborate calculation, whether there is any indication of a correlation between two sets of figures, or whether a set of differences appears to indicate a real effect. In such a case a rough test of significance is wanted, by means of which the data can be separated quickly into those effects which require further examination by more sensitive methods and those which can at once be set aside as either proved beyond dispute as real, or showing no signs of being real.

A convenient and familiar test of this type is provided by the binomial series distribution. In testing a set of differences, the numbers of positive and negative differences are counted, the sizes of the differences being ignored. If there is no real difference, and the errors are symmetrically distributed, positive and negative values should occur with equal frequency. The probability of obtaining r differences of the same sign out of n is

$$^{n}C_{r}\frac{1}{2^{n}}$$

and the exact probability of obtaining r or more than r differences of the same sign is easily calculated. Table I shows, for values of

TABLE I.

Minimum Number (r) *of Like Signs out of* n *Required to Reach* 5 *per cent. Significance.*

n.	r.	n.	r.	n.	r.	n.	r.	n.	r.
—	—	11	10	21	16	31	22	41	28
—	—	12	10	22	17	32	22	42	28
—	—	13	11	23	17	33	23	43	29
—	—	14	12	24	18	34	24	44	29
—	—	15	12	25	18	35	24	45	30
6	6	16	13	26	19	36	25	46	30
7	7	17	13	27	20	37	25	47	31
8	8	18	14	28	20	38	26	48	32
9	8	19	15	29	21	39	26	49	32
10	9	20	15	30	21	40	27	50	33

Above $n = 50$, r may be taken as the smallest integer greater than $\left(\frac{n}{2}+\sqrt{n}\right)$.

n up to 50, the number of differences of like sign, either positive or negative, required to reach the 5 per cent. level of significance. These numbers do not, of course, correspond exactly to 5 per cent. probabilities, since the binomial distribution is discrete. The probability of obtaining 9 or more like signs out of 10 is, for example, 0·0215, but the probability of obtaining 8 or more is 0·109, which does not reach the 5 per cent. level of significance. The 5 per cent. level of significance is not reached until $n = 6$, even if all signs are the same.

The test may also be used in examining a possible correlation between two sets of figures. The method consists in finding the mean of each set, and noting the number of pairs of values whose deviations from the mean are of the same sign. If this is unusually large, a positive correlation is indicated; if it is unusually small, a negative one. This test is perhaps more useful than the corresponding test on differences, in that the exact calculation of the correlation coefficient is more laborious to make than the test of a mean difference.

An example of the use of the binomial series distribution in testing a set of differences has been given by Fisher,* and may also be used to illustrate the test of a correlation. Table II is taken from the data given by Fisher.

TABLE II.

Additional Hours of Sleep Gained by the Use of Hyoscyamine Hydrobromide.

Patient.	1 (dextro-).	2 (lævo-).	Difference (2 − 1).
1	+ 0·7	+ 1·9	+ 1·2
2	− 1·6	+ 0·8	+ 2·4
3	− 0·2	+ 1·1	+ 1·3
4	− 1·2	+ 0·1	+ 1·3
5	− 0·1	− 0·1	0·0
6	+ 3·4	+ 4·4	+ 1·0
7	+ 3·7	+ 5·5	+ 1·8
8	+ 0·8	+ 1·6	+ 0·8
9	0·0	+ 4·6	+ 4·6
10	+ 2·0	+ 3·4	+ 1·4
Mean ($\bar{x}$)	0·75	+ 2·33	+ 1·58

One of the differences is zero, but the remaining nine are all positive, which points strongly to a real superiority of Lævo- over Dextro-. The significance level indicated by this test is $2/2^9$ or 1 in 256, whereas the exact level given by the *t* test is about 1 in 700. We might also wish to test whether the patients' responses to the two types of drug were correlated. It is easily verified from Table II that the responses to the two drugs lie on the same sides of their respective mean responses, except for patients 8 and 9. Thus there are 8 similar responses out of 10. This does not reach the 5 per cent. significance level, as reference to Table I shows, but it is sufficiently near to call for further examination by the exact test of significance. We find $r = 0{\cdot}795$, which is significant at the 1 per cent. point.

---

* R. A. Fisher, *Statistical Methods for Research Workers*, § 24. Edinburgh: Oliver and Boyd.

The above is not a good illustration of the practical circumstances in which the tests would be useful. The number of pairs of observations (10) is small, and one would be reluctant to discard any information; further, for the same reason, the exact tests of significance can be made without labour. It is when the number of observations is large, say over 40, so that some information may be spared and the exact tests are more laborious, that the approximate tests will be useful in a preliminary analysis.

The object of this note is to compare the efficiencies of these tests with those of the exact tests, *i.e.* to determine how much information is thrown away by ignoring the sizes of the differences or of the deviations from the means. The point is of some importance, because if the tests prove to be of low efficiency, further examination may still be required when they give a result of non-significance.

2. *The Efficiency of the Binomial Series Test of a Difference.*

If the differences vary normally and independently about a mean μ, with standard deviation σ, the probability p of obtaining a positive difference is

$$p = \frac{1}{\sigma\sqrt{2\pi}}\int_0^\infty e^{-\frac{(x-\mu)^2}{2\sigma^2}}\,dx$$

$$= \frac{1}{\sqrt{2\pi}}\int_{-\underline{\mu}}^{\infty} e^{-y^2/2}\,dy$$

Hence, by estimating p from the observed distribution of positive and negative signs, we obtain an estimate of $\frac{\mu}{\sigma} = \tau$ (say)

Now, $$\delta p = +\frac{1}{\sqrt{2\pi}}e^{\frac{-\tau^2}{2}}\,\delta\tau$$

Hence $$V(\tau) = 2\pi e^{\tau^2}V(p) = 2\pi e^{\tau^2}pq/n.$$

An efficient estimate of $\frac{\mu}{\sigma}$ is

$$\frac{\bar{x}}{\sqrt{\frac{S(x-\bar{x})^2}{n-1}}} = \frac{t}{\sqrt{n}},$$ where t is Student's t.

And $$V(\hat{\tau}) = \frac{1}{n-2}.$$

The efficiency of estimation by the binomial series is given by the ratio of the variances of $\hat{\tau}$ and τ when n is large.

$$\text{Efficiency} = \frac{V(\hat{\tau})}{V(\tau)} = \frac{1}{2\pi pqe^{\tau^2}}.$$

Table III shows the percentage efficiency of estimation for a series of values of $\frac{\mu}{\sigma}$.

TABLE III.

Percentage Efficiency of Estimation of $\frac{\mu}{\sigma}$ by Taking Account of Signs Only.

$\frac{\mu}{\sigma}$.	0	± ½	± 1.	± 1½.	± 2.	± 2½	± 3.
	63·7	58·1	43·9	26·9	13·1	5·0	1·5

The efficiency is greatest when $\frac{\mu}{\sigma} = 0$ at which it has the value $\frac{2}{\pi}$. Thereafter it decreases steadily to zero. This is to be expected, since when $\frac{\mu}{\sigma}$ is large, the signs of the differences will all be positive except very rarely, and the estimate of $\frac{\mu}{\sigma}$ will almost always be $+\infty$.

The efficiency of the test as a test of significance is its efficiency of estimation when $\frac{\mu}{\sigma} = 0$, and is $\frac{2}{\pi}$, *i.e.* just under ⅔. Thus about ⅓ of the information is discarded by taking account of signs only.

3. *The Efficiency of the Binomial Series Test of a Correlation Coefficient.*

We may assume that the pairs of values, x and y, are distributed about zero in a bivariate normal distribution. The probability of obtaining two deviations of like sign is

$$p = \frac{1}{2\pi\sigma_1\sigma_2\sqrt{1-\rho^2}} \int_{-\infty}^{0}\int_{-\infty}^{0} + \int_{0}^{\infty}\int_{0}^{\infty} e^{-\frac{1}{2(1-\varrho^2)}\left(\frac{x^2}{\sigma_1^2} - \frac{2\varrho xy}{\sigma_1\sigma_2} + \frac{y^2}{\sigma_2^2}\right)} dxdy$$

This may be written

$$p = \frac{1}{\pi\sqrt{1-\rho^2}} \int_{0}^{\infty}\int_{0}^{\infty} e^{-\frac{1}{2(1-\varrho^2)}(x^2 - 2\varrho xy + y^2)} dxdy$$

so that the value of p gives an estimate of the correlation coefficient ρ.

$$p = \frac{1}{\pi\sqrt{1-\rho^2}}\int_0^\infty\int_0^\infty e^{-\frac{1}{2}y^2} e^{-\frac{1}{2}\frac{(x-\varrho y)^2}{1-\varrho^2}}\,dxdy$$

$$= \frac{1}{\pi}\int_0^\infty e^{-\frac{1}{2}y^2}dy\int_{\frac{-\varrho y}{\sqrt{1-\varrho^2}}}^{\infty} e^{-\frac{1}{2}u^2}du$$

$$= \tfrac{1}{2} + \frac{1}{\pi}\int_0^\infty e^{-\frac{1}{2}y^2}dy\int_0^{\frac{\varrho y}{\sqrt{1-\varrho^2}}} e^{-\frac{1}{2}u^2}\,du.$$

This may be written

$$\tfrac{1}{2} + \frac{1}{\pi}\iint e^{-\frac{1}{2}(x^2+y^2)}\,dxdy$$

over the sector of the x, y plane in which θ lies between 0 and $\sin^{-1}\rho$. A change to polar co-ordinates gives at once

$$p = \tfrac{1}{2} + \frac{\sin^{-1}\rho}{\pi}$$

Hence

$$\frac{dp}{d\rho} = \frac{1}{\pi\sqrt{1-\rho^2}}$$

Hence if ρ_b is the estimate of ρ

$$V(\rho_b) = \pi^2(1-\rho^2)\,V(p) = \frac{\pi^2(1-\rho)^2 pq}{n}$$

The variance of an efficient estimate of ρ is $\dfrac{(1-\rho^2)^2}{n-1}$, so that the efficiency of estimation of ρ by the binomial series distribution is

$$E = \frac{(1-\rho^2)}{\pi^2 pq}$$

The percentage efficiencies for a series of values of ρ are shown in Table IV.

TABLE IV.

Percentage Efficiency of Estimation of ρ by Taking Account of Signs Only.

ϱ	0·0.	±0·1.	±0·2.	±0·3.	±0·4.	±0·5.	±0·6.	±0·7.	±0·8.	±0·9.	±1·0.
E	40·5	40·3	39·6	38·3	36·6	34·2	31·2	27·5	22·4	15·6	0·0

The efficiency decreases slowly from the value $\dfrac{4}{\pi^2}$, at $\rho = 0$, to zero at $\rho = \pm 1$. The efficiency of the binomial series test of significance is 40 per cent. This rather low figure indicates that the test must be used with caution in setting aside data on the grounds that there is no apparent correlation. A glance at the sizes of the deviations from the mean will, however, generally enable one to decide whether the question requires further investigation.

A NEW CALCULATION OF THE POVERTY LINE.

By R. F. GEORGE.

(*Chairman's Address to the Study Group of the Royal Statistical Society, October 20th,* 1936.)

IT should be emphasized at the very outset that under no circumstances can the "Poverty Line" be regarded as a desirable level. It seeks to assess the cost of a standard of living so low, that while persons below it are living in extreme poverty, those just above it would commonly be regarded as very poor. In view of the increased and practical interest in the economic condition of the people that has been a feature of recent years, it is felt that a critical consideration of the way in which the poverty line has been calculated is justified. Recent advances in the science of nutrition alone justify material alteration in the commonly accepted minimum diet.

All the post-war enquiries into the extent of poverty, with the exception of the Sheffield (1931) investigation, have used the standard based on the poverty line calculated by Rowntree early in the present century. In his book, *Poverty—a Study of Town Life* (1901), Rowntree endeavoured to obtain the absolute minimum cost of physiological needs, in order to see how far the general conclusions reached by Charles Booth for London would apply to smaller urban populations.

The needs of the family are assumed to consist of the following items: food, clothing, fuel (including gas used for heating and cooking), lighting, cleaning materials, compulsory insurance, expenses of travelling to and from work, and, finally, rent. The common practice in measuring the poverty of a family is to calculate the minimum cost of these items with the exception of rent. The actual rent paid is deducted from the family income from all sources, and the remainder is the amount available to satisfy the computed requirements of minimum needs. It is argued (*New Survey of London Life and Labour,* Vol. III, p. 73) that it is impossible to lay down a general minimum for rent, since it cannot be assumed that a workman is, in general, free to move or obtain accommodation to suit his requirements and income, especially in recent years, since rent has been controlled.

Since the technique of the poverty line was first adumbrated, new considerations have arisen which, if given effect, must alter certain of the standards used by Rowntree and since followed. This is particularly the case with regard to food for which in recent years new physiological minima, especially for children, have been established.

1. FOOD.

Two main rations have been used in post-war social surveys, viz., that adopted by Professor Bowley for his enquiry *Has Poverty Diminished?* (1924), and that taken for the *New Survey of London Life and Labour* (1928–9). They are given in detail for the adult male in the following table.

Weekly Minimum Diet for an Adult Male.

	1924 (Prof. Bowley).	1928–9 (London Survey).			1924 (Prof. Bowley).	1928–9 (London Survey).	
	Quantity.	Quantity.	Cost.		Quantity.	Quantity.	Cost.
			d.				*d.*
Bread	5 lb	10·4 lb.	22·26	Potatoes ...	2·5 lb.	2·5 lb.	3·07
Flour	1·1 ,,	1·1 ,,	2·75	Vegetables ...	0·5 ,,	0·5 ,,	0·63
Bacon	0·75 ,,	0·75 ,,	9·75	Sugar ...	0·32 ,,	0·32 ,,	0·96
Meat	2·0 ,,	2·0 ,,	16·00	Cocoa ...	0·5 ozs.	0·5 ozs.	0·70
Lard, etc. ...	0·3 ,,	0·3 ,,	2·70	Tea	2·0 ,,	2·0 ,,	3·00
Margarine ...	0·5 ,,	0·5 ,,	3·00	Coffee ...	0·5 ,,	0·37 ,,	0·46
Milk, fresh ...	0·8 pts.	2·8 pts.	8·75	Oatmeal ...	3·6 lb.	—	—
Cheese	0·75 lb.	0·75 lb.	9·73	Milk, skim ...	4·0 pts.	—	—
Peas	0·2 ,,	0·2 ,,	0·94	Meat liquor ...	4·5 ,,	—	—

The quantities used in the 1924 diet are of general reference, and do not refer to any particular town. The scale is primarily based on Rowntree's original calculations with, however, a number of variations. Rowntree's standard, for example, contained no meat, in order that the cost might be the absolute minimum, whereas Professor Bowley introduced this item on the grounds that a workman would, in fact, sacrifice part of the defined necessaries in favour of a meat diet. The cost of the above ration in 1924 was estimated to be 7*s.* 7*d.* It is pointed out that the standard is not to be taken as a physiological or economic minimum, but as an intelligible scale on which the nourishment computed to be necessary could be obtained. Since it must be assumed that in the vast majority of cases 2 or more persons are living together, it follows that there actually is more elasticity in the diet than appears in the actual ration as given. The standard for an adult male gives rather more than 3,500 calories per day.

The food scale used by Professor Bowley in 1924 suffered slight variations for the purpose of measuring the minimum cost of food in connection with the *New Survey of London Life and Labour* in 1928–9. These alterations were justified on the ground that the standard food budget formerly employed should be modified in accordance with London habits, so that oatmeal was eliminated and bread correspondingly increased, and skimmed milk was similarly replaced by the equivalent quantity of fresh or condensed milk. The total cost of the 1928–9 ration in London was estimated at 7*s.* 1*d.* The scale gives 3,750 calories and 126 grammes of protein daily. Adult males engaged in very heavy labour were allowed 10 per cent. in addition to the above cost; in practice this was applied to dockers only.

For the *Social Survey of Merseyside* (1928) the food taken for the adult male in the 1928–9 London Survey was adopted, and, valued at prices in Liverpool during October 1928, the total cost was calculated at 6*s.* 3*d.* (compared with 7*s.* 1*d.* in London).

In measuring the extent of poverty in Southampton in 1931, Dr. Ford took the diet prescribed by Professor Bowley in his 1924 enquiry. The actual cost of the food budget is not given in detail in *Work and Wealth in a Modern Port* (p. 115 and p. 207), but if clothing is assumed to cost 7*d.* weekly for an adult, and lighting and cleaning 3½*d.*, the cost of food in Southampton in 1931 was 6*s.* 2½*d.* for an adult male.

The enquiry undertaken in 1931 by the Sheffield Social Survey Committee into the standard of living in Sheffield based its minimum food standard on the budget outlined by the 1918 Cost of Living Committee. The quantities taken together with the cost at Sheffield prices in December 1931 were as follows:

	Weekly Quantities per Adult Man.	Cost.		Weekly Quantities per Adult Man.	Cost.
		d.			*d.*
Bread	5·25 lb.	9·19	Butter	0·11 lb.	1·54
Flour	2·06 ,,	2·575	Margarine ..	0·35 ,,	2·1
Rolled Oats ...	0·83 ,,	2·49	Fresh Milk ...	2·01 pts.	6·03
Rice	0·30 ,,	0·9	Condensed Milk	0·33 lb.	1·155
Dried Peas ...	1·00 ,,	3·5	Cheese	0·183 ,,	1·456
Biscuits	0·69 ,,	4·83	Sugar	1·28 ,,	3·2
Bacon	0·26 ,,	1·82	Fresh Eggs ...	1	1·25
Beef	0·98 ,,	6·86	Tea	0·15 lb.	1·5
Mutton	0·50 ,,	4·0	Potatoes ...	3·4 ,,	3·4
Sausages ...	0·90 ,,	6·3	Carrots	1·0 ,,	1·5
Lard	0·224 ,,	1·456	Cabbage ...	1·0 ,,	1·5

The total cost of this food budget is 5*s.* 9*d.*, and, following the practice of the London Survey, men engaged in heavy manual work were given an extra allowance of 10 per cent.

So far, attention has been directed to the quantities and cost of food actually allowed in certain post-war social enquiries with reference to the poverty line. With one exception they are all based directly or indirectly on Rowntree's original standard. In recent years, however, nutrition experts have also been considering the minimum desirable diet of the people objectively, and quite apart from the purpose of the social investigator. This somewhat different point of view may not necessarily lead to any significant difference between the food standards laid down by the social investigator on the one hand and by the nutrition expert on the other, since the former must primarily rely on the latter, at least for data as to basic dietetic requirements. Even so, in one aspect of principle, recent work by dieticians does strongly suggest the need for a new technique, at least with regard to very young persons.

The statisticians have invariably assumed that the diet of persons other than the adult male can be calculated by taking a proportion of the adult male's ration according to the calorie requirements of the other types. Thus if the minimum desirable diet of the male is estimated to cost 7*s.* 6*d.*, that of the child of 3 to 6 years, whose calorie needs are half those of the male, is assumed to be 3*s.* 9*d.* But since the desirable foods for the child are substantially different from those for a man, this practice of assessing needs by applying a calorie ratio to cost is open to criticism.

The British Medical Association in 1933 set up a special committee " to determine the minimum weekly expenditure on foodstuffs which must be incurred by families of varying size if health and working capacity are to be maintained, and to construct specimen diets." In the Report of the Committee on Nutrition (B.M.A. 1933) the cost of specimen diets for other types of persons is calculated. The ratio of the cost of each diet to the cost of a diet for an adult male, *i.e.* the " mean cost coefficient," gives for all persons above the age of 6, almost perfect agreement with the man-value calorie coefficient. It is pointed out (p. 42) that for persons of 10 years and upwards, the calorie coefficient and the cost coefficient are identical because the individual requirements of food are simple fractions of the basic diet per man unit. In the case of children below the age of 10, however, qualitative requirements raise the cost scale above the calorie scale. Thus, for infants, it is demonstrated that the cost of a modest diet is significantly greater than that indicated by applying the calorie ratio, largely because of the allowance of 1 pint of milk per day (an expensive food) to the child under 5; from 5 to 10, this quantity is reduced to ½ pint daily while, for an adult, the ration is further reduced to ¼ pint daily.

The B.M.A. give three specimen diets for an adult. The first is no more than a bare ration, which, " though perhaps palatable for one week, would with longer use become monotonous and nauseous." The second diet is one "commonly used by the working classes in receipt of adequate wages," while the third is vegetarian. The second of these diets valued at prices collected by the B.M.A. from certain parts of the country during two weeks in the summer of 1933 is as follows:

	Quantity.	B.M.A. Cost 1933.		Quantity.	B.M.A. Cost 1933.
		s. *d.*			*s.* *d.*
Beef	1 lb.	6	Sugar	1 lb.	2¼
Mince	½ "	2½	Jam	¾ "	3¼
Bacon	½ "	3	Potatoes ...	5 "	3¾
Corned Beef ...	½ "	3	Peas	¼ "	1
Liver (ox) ...	¼ "	1¾	Tea	¼ "	3
Eggs	2 oz.	1	Oatmeal ...	½ "	1¼
Cheese	½ lb.	3¼	Rice	¼ "	¾
Milk	1¾ pts.	5	Syrup	½ "	2
Fish (cod) ...	¼ lb.	1¼	Cabbage ...	1 "	1
Butter	¼ "	2½	Beans (butter)	¼ "	¼
Suet	1 oz.	¼	Barley ...	½ "	1
Lard	¼ lb.	1½	Fruit and Veg.	—	7
Bread	7¼ "	1 0½			

The total cost of these foods is 5*s.* 10½*d.* A different diet, involving 7 pints of milk weekly for a child of 1–2 years, cost 2*s.* 8*d.*, and, for a child of 2–3 years, 3*s.* 0¾*d.* The effect of these calculations is to give a ratio for children, on the cost basis, quite different from that calculated on a calorie scale.

The adult male equivalent ratios employed for the investigations mentioned above are summarized as follows:—

Age and Sex.	*Has Poverty Diminished?* 1924.	London Survey, 1928–9.	Merseyside Survey, 1928.	Southampton, 1931.	Sheffield, 1931.	B.M.A., 1933.
Over 70	60	—	—	60	—	—
" 65	—	60	60	—	60	—
" 18 M.	100	100	100	100	100	100
" " F.	80	85	80	80	80	83
16–18 M.	85	100	100	100	100	100
" F.	80	85	80	80	80	83
14–16 M.	85	85	85	85	85	100
" F.	80	80	80	80	80	83
5–14	50	50	50	50	50	75 *
0–5	33	33	33	33	33	53 *

* Average of corresponding age groups 6–14 and 1–6.

The estimated cost of the diets calculated in each of the investigations is given in the table on p. 79.

The diets given in the B.M.A. Report require adjustment with regard to milk so that recent recommendations may be followed. According to the pamphlet entitled *The Nutritive Value of Milk* (issued by the Ministry of Health Advisory Committee on Nutrition), children should consume from 1 to 2 pints of milk daily and adults should consume ½ pint daily. The Report entitled *The Physiological Bases of Nutrition* (by the Technical Commission appointed by the Health Committee of the League of Nations) endorses these recommendations for children, although the quantity advised for children aged 1–2 years is ¾ of a litre instead of the 1 litre recommended for older children. In other respects the scheduled diets for young children given by the Technical Commission are not significantly dissimilar from those of the B.M.A.; there are minor differences which are not large enough to warrant special notice. With regard to milk, however, there is every justification for modifying the diets given in the B.M.A. Report by increasing the quantity allowed. This, however, would result in an excess of protein, fat, carbohydrate and calories, and a further adjustment is necessary to restore the correct nutritive content of the minimum diet. This has been effected by withdrawing from the B.M.A. schedule the appropriate amount of other food or foods, having regard as far as possible to such considerations as the ratio of first- and second-class protein.

Age and Sex.	*Has Poverty Diminished?* 1924.	London Survey, 1928–9.	Merseyside Survey, 1928.	Southampton, 1931.	Sheffield, 1931.	B.M.A., 1933.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Over 70	4 7	—	—	3 8½	—	—
„ 65	—	4 4	3 9	—	3 5½	—
„ 18 M.	7 7	7 1	6 3	6 2½	5 9	5 11
„ „ F.	6 1	6 1	5 0	5 0	4 7	4 11
16–18 M.	6 5	7 1	6 3	6 2½	5 9	5 11
„ F.	6 1	6 1	5 0	5 0	4 7	4 11
14–16 M.	6 5	6 1	5 4	5 3½	4 10½	5 11
„ F.	6 1	5 8	5 0	5 0	4 7	4 11
5–14	3 9	3 6	3 1½	3 1	2 10½	4 6 *
0–5	2 6	2 4	2 1	2 1	1 11	3 2 *

* Average of corresponding age groups 6–14 and 1–6.

The milk allowance given in the new dietary schedules compared with that contained in the B.M.A. schedules on p. 80.

The detail of the adjustments is given in Appendix I, and the result of the adjustment in terms of the "adult male equivalent" compared with the original B.M.A. schedule is given in Appendix II.

It should be noted that the Report on the Physiological Bases of Nutrition lays down somewhat different scales in respect of protein and calorie requirements from those of the B.M.A. Report. The difficulty of interpreting these new scales and applying them to a dietary schedule is discussed in Appendix II.

The cost of the B.M.A. diets for the adult male and for children up to 14 has been revised in the light of the extra milk allowance and the consequent alteration in other items in the diet. The official retail cost-of-living index has been applied to estimate the relative cost of the revised diets in July 1936. Details of the revision of the cost of the B.M.A. diets are shown in the following table (p. 81).

	New Milk Allowance.	B.M.A. Milk Allowance.
	Pts. wkly.	Pts. wkly.
Adult male	3½	1¾
Child 1–2	8¾ (*a*)	7
2–3	10½ (*b*)	7
3–6	10½ (*b*)	7
6–8	7 (*c*)	3½
8–10	7 (*c*)	3½
10–12	7 (*c*)	3½ (*d*)
12–14	7 (*c*)	3½ (*d*)

(*a*) Based on L. of N. Report—¾ litre daily.
(*b*) Based on Nutrition Committee's Report—1–2 pints daily.
(*c*) Based on Minimum quantity recommended in the Report of the Nutrition Committee.
(*d*) Assumed; details of these diets are not given.

From the above calculations the cost in July 1936 of the minimum diet for children 1–6 is 3*s.* 10*d.*, and for children 6–14, 5*s.* 5*d.*

For women over the age of 14, the mean cost coefficients given by the B.M.A. have been adopted with the slight amendment that 83 is rounded off to 85. The B.M.A. report gives no information as to the minimum cost of food for elderly persons. It has been the common practice to take a coefficient of 60 for persons of 65 or 70 years of age or over, and in the absence of an authoritative reason to change this factor, it has been adopted without alteration. In the table below, 70 rather than 65 is taken as the lower age limit of elderly persons, since those on the poverty line are most likely to keep on working as long as possible; their circumstances do not encourage early retirement from gainful employment. They may, on the other hand, be on or below the poverty line on account of their inability either to work or to find work.

The cost of the adjusted B.M.A. standard diet, at July 1936,

	Adult Male.	Children.						
		1–2.	2–3.	3–6.	6–8.	8–10.	10–12.	12–14.
1. Cost of B.M.A. diet in July 1933	5*s*. 11*d*.	2*s*. 8*d*.	3*s*. 1*d*.	3*s*. 5*d*.	3*s*. 6½*d*.	4*s*. 2*d*.	4*s*. 9*d*.	5*s*. 4*d*.
2. Cost of milk in (1) above ...	5*d*.	1*s*. 7*d*.	1*s*. 7*d*.	1*s*. 7*d*.	10*d*.	10*d*.	10*d*. ‡	10*d*. ‡
3. Cost of B.M.A. diet without milk in July 1933	5*s*. 6*d*.	1*s*. 1*d*.	1*s*. 6*d*.	1*s*. 10*d*.	2*s*. 8½*d*.	3*s*. 4*d*.	3*s*. 11*d*.	4*s*. 6*d*.
4. Adjustment of (3) to price level in July 1936 *	6*s*. 0*d*.	1*s*. 2¼*d*.	1*s*. 7½*d*.	2*s*. 0*d*.	2*s*. 11½*d*.	3*s*. 8*d*.	4*s*. 3½*d*.	4*s*. 11*d*.
5. Quantity of milk recommended in diet weekly	3½ pts.	8¾ pts.	10½ pts.	10½ pts.	7 pts.	7 pts.	7 pts.	7 pts.
6. Cost of milk in July 1936 ...	10½*d*.	2*s*. 2¼*d*.	2*s*. 7½*d*.	2*s*. 7½*d*.	1*s*. 9*d*.	1*s*. 9*d*.	1*s*. 9*d*.	1*s*. 9*d*.
7. Cost in July 1936 of B.M.A. diet adjusted for milk ...	6*s*. 10½*d*.	3*s*. 4½*d*.	4*s*. 3*d*.	4*s*. 7½*d*.	4*s*. 8½*d*.	5*s*. 5*d*.	6*s*. 0½*d*.	6*s*. 8*d*.
8. Cost of Food deducted in place of extra milk †	1½*d*.	2½*d*.	4*d*.	3½*d*.	1½*d*.	3*d*.	3*d*. ‡	3*d*. ‡
9. Net cost in July 1936 of revised diet	6*s*. 9*d*.	3*s*. 2*d*.	3*s*. 11*d*.	4*s*. 4*d*.	4*s*. 7*d*.	5*s*. 2*d*.	5*s*. 9*d*.	6*s*. 5*d*.

* The retail cost of food, other than milk, in July 1936 was 26 per cent. above that of July 1914 compared with 15 per cent. in July 1933.

† The amount of these deductions is too small to be materially affected by changes in the price level between July 1933 and July 1936.

‡ Details of diets for children 10–12 and 12–14 are not given. It is assumed that the B.M.A. Committee allowed for these ages the same quantity of milk as for children 6–8 and 8–10. Similarly in the absence of the necessary detail the cost of the food deducted has been taken to be the same as for children 8–10.

and the resulting cost coefficients in relation to the adult male equivalent are as follows:

	Cost of Adjusted B.M.A. Diet at July 1936.		Mean Cost Coefficient.	
	Male.	Female.	Male.	Female.
	s. *d.*	*s.* *d.*		
Over 70	4 1	4 1	60	60
14–70	6 9	5 9	100	85
6–14	5 5	5 5	80	80
Under 6	3 10	3 10	55	55

2. CLOTHING.

The minimum standard taken by Rowntree in 1901 for clothing was 26*s.* for an adult and 22*s.* for a child per annum. In his 1924 enquiry Professor Bowley applied to these figures the rise in the retail cost of clothing of 125 to 130 per cent. and thus assumed that the minimum cost in 1924 was 60*s.* for adults and 50*s.* for children. The weekly minimum cost was therefore estimated at 1*s.* 1½*d.* and 11½*d.* for those over and under 16 years respectively.

The estimate used in the London Survey of 1928–9 was also based initially on Rowntree's 1901 standard, modified, as in the 1924 enquiry above, for changes in retail prices. The final estimate of the minimum cost of clothing in London in 1928–9 was 58*s.* 6*d.* per annum for an adult and 48*s.* for a child, or 1*s.* 1½*d.* and 11*d.* per week.

In the Merseyside enquiry, the minimum cost of clothing was again based on Rowntree's annual estimate. In the Merseyside estimate, however, the minimum cost for clothing is combined with that for cleaning materials and lighting (for which two items Rowntree allowed 2*d.* per head per week). After allowing for price changes, Rowntree's estimates for clothing, cleaning materials and lighting became, in 1928, 1*s.* 5*d.* a week for an adult and 1*s.* 2½*d.* for persons under 16. If we assume that Rowntree's estimate of 2*d.* per head for cleaning and lighting in 1901 was equivalent to 3½*d.* in 1928 (London Survey, Vol. III, p. 73), it follows that the minimum weekly cost of clothing was estimated to amount to 1*s.* 1½*d.* for an adult and 11*d.* for a child, *i.e.* the same figures as those used in the London Survey. For the Merseyside Survey, two further changes were introduced in respect of clothing: (*a*) for all females over 16, an extra allowance of 4½*d.* a week was made, and (*b*) the minimum cost of clothing for persons over 65 was taken to be the same as for persons under 16. The weekly cost of clothing, it is estimated, was therefore calculated in 1928 as follows:

	Male.	Female.
	s. d.	*s. d.*
Over 65	11	11
16–65	1 1½	1 6
Under 16	11	11

For the Southampton (1931) enquiry, the minimum weekly clothing cost adopted is not explicitly stated, but from information given it is inferred that the following scales were used :

	Male.	Female.
	d.	*d.*
Over 70	5	5
16–70	7	6½
Under 16	5	5

These costs are much lower than those commonly accepted because special account was taken of the opportunities provided by jumble sales and the second-hand clothes market.

In the Sheffield (1931) investigation clothing costs were based on the estimates used by Professor Bowley in 1924 adjusted for price changes between 1924 and 1931, and with an extra allowance of 4*d.* per week for women. The scale used in the Sheffield enquiry was :

	s. d.
Man	11½
Woman	1 3½
Child	9½

The estimated minimum cost of clothing adopted in the various post-war social surveys is summarized as follows :

	Over 65.	Man (over 16).	Woman (over 16).	Child (under 16).
	d.	*s. d.*	*s. d.*	*d.*
Bowley, 1924	—	1 1½	1 1½	11½
London Survey, 1928–9 ...	—	1 1½	1 1½	11
Merseyside, 1928	11	1 1½	1 6	11
Southampton, 1931	5 *	7	6½	5
Sheffield, 1931	—	11½	1 3½	9½

* Over 70.

All the above clothing allowances with the exception of the Southampton estimates can be traced back to Rowntree's original calculations of 1901, adjusted for price change, and with an addition for women in the case of Merseyside and Sheffield. Rowntree's estimate was based on the answers given by " a large number of working people" to the following question: "What in your opinion is the very lowest sum upon which a man can keep himself in clothing for a year? The clothing should be adequate to keep the man in health and should not be so shabby as to injure his chances of obtaining respectable employment" (*Poverty*, Chap. IV). The results he obtained gave *26s.* per annum for an adult and *22s.* per annum for children under 13. But the answer to this question would undoubtedly be very different now from the answers received more than 35 years ago. During this period conceptions of clothing have undergone a very definite change, both qualitatively and quantitatively. In certain respects, the materials, and possibly the very garments which were in the minds of those whom Rowntree questioned no longer exist, and in their place we have to-day a variety of both which was unknown in 1901. An example is readily given by reference to stockings, where cashmere or cotton has been almost entirely superseded by lisle or artificial silk. In the second place, the common standard of the minimum amount of clothing is very different to-day from what it was in Rowntree's time. Both these changes probably affect the minimum standard for women and children much more than for men. Women and children now wear less of different things compared with the standard of 35 years ago, than do men.

In effect, therefore, the minimum cost in recent years has been determined by taking a standard applicable to 1901 and converting it on the basis of articles purchased in 1904, measured in cost at July 1914 and in post-war years. The one exception to this is the survey of Southampton by Dr. Ford, who referred to the common practice of buying second-hand clothes and to the advantages of jumble sales, where usable garments can ,be purchased for pence. The results of his independent enquiry was an estimate of *30s.* per annum for a man, compared with *52s.* to *58s.* in the other enquiries. Another point worth noticing is that the clothing costs for children in all the post-war surveys are not much below those of a man. Admittedly children are hard on shoes, trousers and frocks, but the last two items nowadays are extremely cheap for children.

All things considered, I have endeavoured to reconstruct entirely the basis of minimum clothing costs. A schedule of clothing requirements, consistent with current taste and opportunities, was compiled and valued at prices ruling in suburban London in July 1936. The garments were considered from the point of view of the person who is attempting to clothe himself or herself on very slender resources. Notice was taken of variation in summer and winter requirements. Where the articles in the list would last more than one season, their cost has accordingly been adjusted to that of one year. In this respect the estimate has been made for a man, a woman and a child of 10. The effect of these considerations is as follows:

	s.	d.
Annual cost in 1936 for man	47	6
" " " woman	34	0
" " " child	30	0

The possibility of clothing being obtained free or at nominal "jumble sale" prices has not been allowed for in the above calculations. In the surveys considered above, the age limit of a child has been taken at 16, but it is felt that the cost of clothing for boys and girls of 14 and 15 is nearer that for an adult than for a child. For this reason, the minimum cost for an adult is applied to all persons over 14. There is, of course, considerable scope for criticism in the practice of allowing a flat clothing rate for all children even up to 14, and certainly up to 16 years of age. A child below school age cannot possibly cost as much as one at school for minimum clothing needs, and a child of 12 and 13 will almost certainly cost more in this respect than one of 5 or 6. Generally speaking, the clothing cost of a boy of 10 will be that of the average of children of all ages up to 14, although possibly girls' clothes will be less expensive than those for boys.

There are very few data by which to estimate the minimum cost of clothing for elderly persons whose "wear and tear" is undoubtedly below that of the average adult, and probably less than that of school-children. On the other hand, they seem to require more. For this class of person the practice adopted in the Merseyside is followed in my own calculations, so that for old persons the cost of clothing for a child has been taken. To maintain consistency with the minimum food costs, old persons are those of 70 and over.

It has been mentioned by Professor Bowley that it is not practicable to expect young women, at any rate, to dress on an absolutely minimum standard. Circumstances are such that they are almost compelled to adopt a standard somewhat higher than actual minimum needs would dictate. With this in view, I obtained a record of clothing expenditure from a number of working-class girls between 16 and 25 years of age, and interviewed a number of others in working-girls' clubs. The result certainly confirmed Professor Bowley's view, and it seems not only reasonable, but necessary to give an additional allowance to young women; for this purpose I have added 4½*d.* per week for single women between 16 and 30.

By applying the official retail price index for clothing in January and July 1936 (to get a rough average of winter and summer wear), the clothing costs used in the post-war surveys can be compared with the newly calculated clothing cost as follows:

Minimum Weekly Cost of Clothing in certain Post-War Social Surveys (adjusted to January and July 1936) *Compared with the Revised Estimate.*

	Over 65.	Man over 16.	Woman over 16.		Child up to 16.
	d.	*d.*	*s.*	*d.*	*d.*
Has Poverty Diminished?	—	11½		11½	9½
London Survey	—	11½		11½	9½
Merseyside Survey	9½	11½	1	3	9½
Southampton (*a*)	5	7		6½	5
Sheffield	—	11	1	2½	9
New Estimates (*b*)	7	11		8 (*c*)	7

(*a*) Elderly persons are those over 70.

(*b*) The age discrimination for adults and children is at 14, and for elderly persons, 70.

(*c*) For single women of 16–30 years of age, this is increased to 1*s.* 0½*d.*

It appears that for the adult man of 16–65 the minimum cost taken in the post-war surveys is virtually the same (when adjusted by the retail price index for clothing) as the result obtained by the new estimate. This tends to confirm the opinion that the fashion and taste in men's essential apparel have changed relatively little since the beginning of the century—the costly items in the necessary wear, *e.g.* overcoats, suits, boots, have suffered no material alteration.

3. CLEANING MATERIALS AND LIGHTING.

In every case the allowance for cleaning materials and lighting has been based on Rowntree's original estimate of 2*d.* per week per person. In 1924, Professor Bowley computed that the rise in prices brought Rowntree's allowance up to 3½*d.* per head per week, and with the exception of the Sheffield Survey (1931), this cost has been adopted in each of the subsequent surveys without alteration. In Sheffield, the standard cost of 3½*d.* was modified to 3*d.* for adults and to 2½*d.* for children, for the reasons that prices of soap materials had fallen somewhat since 1924 (when the 3½*d.* was first computed) and that gas and electricity were particularly cheap in Sheffield.

In attempting to construct a new poverty line, the obvious criticism of the practice hitherto adopted is that the cost of cleaning materials and lighting do not vary directly with the number of persons in the family. So far as domestic cleanliness and lighting are concerned, the cost for one person is probably very much more than half the cost for two. It seems, in fact, that only the cost of personal cleanliness for a family is dependent on the number of bodies involved. I have therefore analysed the cost of cleaning and lighting according to the size of the family from a number of budgets obtained in recent investigations. The result is as follows :

Cost per Head of Cleaning Materials and Lighting According to Size of Family.

	Merseyside, 1929–31.		Stockton-on-Tees, 1932.		Manchester, 1933.		Newcastle-on-Tyne, 1933–4.	
Number of Families.	233.		73.		37.		89.	
Size of Family.	Cleaning.	Lighting.	Cleaning.	Lighting.	Cleaning.	Lighting.	Cleaning.	Lighting.
	d.	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*	*d.*
2	8·8	Not separately given.						
3	5·5		2·0	3·2	5·3	4·8	4·4	5·5
4	3·9		2·1	3·7	3·8	5·8	3·7	3·9
5	3·3		2·0	2·5	3·1	2·8	2·8	3·3
6	2·3		1·7	1·4	3·0	2·8	2·6	3·5
7	2·2		1·4	1·3			1·8	2·3
8	1·9						1·8	2·2
9	2·2							

It is to be admitted at once that the numbers of families included in the above table are too few to permit hard-and-fast conclusions. Nevertheless, there is a distinct tendency for the cost per head of cleaning and lighting to fall as the family increases. There are exceptions, such as the lighting costs in the Stockton and Manchester families of 3 and 4 persons. But in the largest collection of budgets, that of the Merseyside, the cost per head of cleaning materials falls so consistently as the family gets larger that the total cost is almost constant irrespective of the size of the family. It is felt that the above table gives sufficient confirmatory evidence to abandon the principle of the flat cost per head.

For cleaning and lighting the minimum cost is primarily dependent on the number of rooms occupied, but even where the family is living in 3 or more rooms, only one will commonly be used during the day, and the large part of the expenditure on cleaning and lighting will, therefore, be in respect of the one living-room. Since almost all the families concerned in the above table were in poor circumstances (some of the families in Stockton-on-Tees and Newcastle indeed were in real distress), there is no reason to suppose that they were extravagant in these two items.

The above analysis of the cost of cleaning and lighting can only indicate the variation in expenditure per head, and cannot be expected to throw light on the actual minimum cost. It appears to be necessary, therefore, to consider the actual minimum consumption of soap and lighting. For a family of 3 persons it is probable that a pound bar of soap at 4*d.* would suffice for a week's cleanliness. This may not unreasonably be increased to 6*d.* in order to allow for scouring materials. For lighting an average of about 20 hours per week would be required, costing say about 4*d.* These two assumptions give a total cost of 3⅓*d.* per head per week for a family of 3 persons. There is no need to discriminate between children and adults, for the former cause more washing of clothes to compensate for the smaller body surface. This method of estimating minimum cost has been applied to families of different sizes, and it is, therefore, proposed to allow for these two items the following amounts:

Number in Family.	Minimum Estimated Cost: Cleaning.	Minimum Estimated Cost: Lighting.	Total Cost.	Cost per Head.
	d.	*d.*	*d.*	*d.*
1	2	4	6	6
2	4	4	8	4
3	6	4	10	3⅓
4	7	5	12	3
5 or more	9	6	15	3

It is seen that the flat rate of 3½*d.* per head usually taken is not substantially different from the above calculations for families of two or more persons.

4. FUEL.

The common practice used in the social surveys considered has been to allow 1½ cwt. of coal per week for the family and to apply local current prices to this quantity, although Rowntree in his original enquiry allowed almost 2 cwt. per family per week. In the Southampton enquiry this figure was reduced by 6*d.*, because low-grade coal could be purchased very cheaply by the bucket from wharves. The estimated minimum cost for the Sheffield investigation was based on an assumption of 1 cwt. in summer and 2 cwt. in winter, giving an average of 1½ cwt. throughout the year, with the qualification that the cost to miners' families was a flat expense of 1*s.*

It seems probable that a constant cost per family without regard to size can be taken with more justification for fuel than for any other item, although the following figures, taken from certain family budget enquiries, suggest that the cost is not independent of the number in the family.

Cost of Fuel per Family in Certain Family Budget Investigations.

	Stockton-on-Tees, 1932.	Manchester, 1933.	Newcastle-on-Tyne, 1933–4.
Number of Families . .	73.	37.	89.
	s. *d.*	*s.* *d.*	*s.* *d.*
Size of Family: 3	2 0	3 0	2 0
" " 4	2 0	4 0	2 0
" " 5	2 1	3 4	2 6
" " 6	2 6	4 0	2 6
" " 7	2 7½	—	2 4
" " 8	—	—	2 8

From the Stockton and Newcastle figures it is clear that a large family consumes more fuel than a small one, but the increase in cost does not occur until the family contains 5 or 6 persons. The data for Manchester are very irregular in this respect. Unfortunately no details are available for a 2-person family, but since the third individual in the family of 3 is more often a child than not, the cost for 2 persons may be taken as that for 3. It is also assumed that the cost for a family of 1 is the same as for families of 2 and 3 people. Fuel in the sense of coal is, however, commonly used for cooking as well as for heating, and where gas is used for this purpose the cost will be reckoned as fuel. It may be objected that the cost of fuel for cooking will vary with the amount of food cooked, and therefore according to the size of family. But in the great majority of cases the coal used for heating supplies the heat for cooking as well, and separate consideration of the cost of fuel for cooking as such is therefore hardly justified. It must be remembered, however, that a gas-ring is not infrequently used for boiling water and for small cooking, especially in the summer when a fire is dispensed with.

In general, it is felt that an allowance of 1¼ cwt. of coal per week for families up to 4 persons and of 1½ cwt. for families of 5 or more, may safely be taken. Naturally, where local conditions give exceptional advantages in the purchase of coal, *e.g.* to miners' families, such circumstances should be borne in mind. The cost of 1¼ cwt. and of 1½ cwt. of coal at average prices in London last January and July (2*s.* 4*d.* per cwt.) give a necessary expenditure on this account of 2*s.* 11*d.* for families of 4 or less, and of 3*s.* 6*d.* for those of 5 or more.

We have now covered food, clothing, cleaning and lighting, and fuel, so that in reckoning the minimum cost of living for any given family, further allowance need only be made for compulsory insurances, necessary travelling and rent. In respect of these items it is unnecessary to make any calculations for this purpose. They are definite, ascertainable liabilities, and can be accurately determined for any given family. We may therefore deduct these particular items from the family income and compare what is left with the estimated cost of the family's food, clothing, cleaning and lighting, and fuel. It is in respect of these items only that the principles adopted by social investigators are liable to be modified or altered.

The result of the revised calculations of minimum weekly cost in 1936 is summarized as follows:

	Food.		Clothing.	
	Male.	Female.	Male.	Female.
	s *d.*	*s.* *d.*	*d.*	*d.*
Over 70	4 1	4 1	7	7
14–70	6 9	5 9	11	8 *
6–14	5 5	5 5	7	7
Under 6	3 10	3 10	7	7

* Single women of 16–30 years of age are given an additional allowance of 4½*d.* per week.

Size of Families.	Cleaning and Lighting.	Fuel.	
	d.		*s* *d.*
1	6	Families of 4 or less persons	2 11
2	8	„ 5 or more persons	3 6
3	10		
4	12		
5 or more	15		

The estimated cost of food is based on prices throughout the country as a whole while the estimates for clothing, cleaning and lighting, and fuel are based on London prices.

In order to indicate the effect of the methods suggested in this paper, the estimated cost on the new basis, compared with the cost of the minimum scale used in the social enquiries considered (adjusted to comparable dates by the official retail price index), is given below for three types of family: (*a*) man and wife, (*b*) man, wife and child of 10, and (*c*) man, wife and 2 children aged 10 and 4 respectively.

The figures below are not strictly comparable, since the original estimates were made in each case in the light of local prices, and the adjustments for these tables have been made by applying the appro-

(a) *Family Consisting of Man and Wife.*

	Food.	Clothing.	Cleaning and Lighting.	Fuel.	Total.
	s. d.	*s. d.*	*d.*	*s. d.*	*s. d.*
1. *Has Poverty Diminished?* ...	10 4	1 11	7	2 6 *	15 4
2. London Survey	11 0	1 11	7	3 1	16 7
3. Merseyside	9 3	2 3	7	2 5	14 6
4. Southampton	11 0	1 1	7	2 6	15 2
5. Sheffield	10 2	2 2	6	2 1	14 11
New Method	12 6	1 7	8	2 11	17 8

* Average of 4 towns.

(b) *Family Consisting of Man, Wife and Child of* 10.

	Food.	Clothing.	Cleaning and Lighting.	Fuel.	Total.
	s. d.	*s. d.*	*d.*	*s. d.*	*s. d.*
1. *Has Poverty Diminished?* ...	13 3	2 9	10½	2 6 *	19 4½
2. London Survey	13 10	2 9	10½	3 1	20 6½
3. Merseyside	11 10	3 1	10½	2 5	18 2½
4. Southampton	14 1	1 6	10½	2 6	18 11½
5. Sheffield	13 0	3 0	8½	2 1	18 9½
New Method	17 11	2 2	10	2 11	23 10

* Average of 4 towns.

(c) *Family Consisting of Man, Wife, Child of* 10, *and also Child of* 4.

	Food.	Clothing.	Cleaning and Lighting.	Fuel.	Total.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*
1. *Has Poverty Diminished?* ...	15 1	3 6	1 2	2 6 *	22 3
2. London Survey	14 5	3 6	1 2	3 1	22 2
3. Merseyside	13 6	3 10	1 2	2 5	20 11
4. Southampton	16 2	1 11	1 2	2 6	21 9
5. Sheffield	14 11	3 9	11	2 1	21 8
New Method	21 9	2 9	1 0	2 11	28 5

* Average of 4 towns.

priate index of retail prices for the country as a whole. It is not thought, however, that the comparison is seriously misleading.

The outstanding feature is that in every case the total minimum cost of the items considered on the revised basis is greatly in excess of the estimates hitherto accepted. For the married couple, the new standard is above those of previous surveys by amounts varying from about 1*s.* to 3*s.* weekly; for the married couple with a child of school age, the excess varies from 3*s.* 3*d.* to 5*s.* 8*d.*; and for the family of man and wife with 1 child of, and 1 child below, school age, the revised estimate exceeds former standards by amounts varying from 6*s.* 2*d.* to 7*s.* 6*d.* weekly. The excess of the revised standard increases with the number of children. This is almost entirely due to the present-day conception of minimum food requirements. Even for the married couple, the revised minimum cost of food is greater than the cost hitherto generally accepted, and this tendency becomes strongly pronounced as children come into the family. With regard to clothing, the revised estimate is lower than that of the surveys, with the exception of Southampton, where jumble sales and second-hand clothes influenced the calculations. The new minimum cost of cleaning and lighting is much the same as the other estimates, but for fuel it tends to be higher. Lighting and fuel in Sheffield were mentioned as being particularly cheap.

The result of these calculations suggests that the minimum needs standards should be significantly higher than those hitherto accepted, with the result that the extent of absolute poverty has been under-estimated.

APPENDIX I.

The Nutritive Content of the B.M.A. Diet and its Adjustment with Regard to the Extra Milk Allowance.

	Protein gms. daily.	Fat gms. daily.	Carbo-hydrate gms. daily.	Calories daily.
1. *Adult Male.*				
Original diet	99·4	100·8	494·1	3,386
Add for extra milk allowed (¼ pint daily)	4·7	5·1	6·8	94
Total with milk	104·1	105·9	500·9	3,480
Deduct ¼ lb. cheese weekly (costing 1½*d.*)	4·2	5·7	0·5	72
Adjusted diet	99·9	100·2	500·4	3,408
2. *Children* 8–10. Cathcart Equivalent = 70.				
Original diet	71·1	75·5	342·1	2,403
Add for extra milk allowed (½ pint daily)	9·4	10·2	13·6	188
Total with milk	80·5	85·7	355·7	2,591
Deduct ½ lb. cheese weekly (costing 3*d.*)	8·3	11·3	1·0	144
Adjusted diet	72·2	74·4	354·7	2,447
Scale for adult male	100·0	100·0	500·0	3,400
Scale for child 8–10 with adult male = 100	72	74	71	72
3. *Children* 6–8. Cathcart Equivalent = 60.				
Original diet	59·6	57·0	298·1	1,997
Add for extra milk allowed (½ pint daily)	9·4	10·2	13·6	188
Total with milk	69·0	67·2	311·7	2,185
Deduct ¼ lb. cheese weekly (costing 1½*d.*)	4·2	5·7	0·5	72
Adjusted diet	64·8	61·5	311·2	2,113
Scale for adult male	100·0	100·0	500·0	3,400
Scale for child 6–8 with adult male = 100	65	61	62	62
4. *Children* 3–6. Cathcart Equivalent = 50.				
Original diet	50·4	49·9	257·1	1,732
Add for extra milk allowed (½ pint daily)	9·4	10·2	13·6	188
Total with milk	59·8	60·1	270·7	1,920
Deduct ¼ lb. corned beef weekly (1½*d.*)	4·3	3·0	—	46
Deduct ½ lb. flour weekly (1½*d.*) ...	3·2	0·5	24·5	119
Deduct 1 oz. butter weekly (½*d.*) ...	—	3·4	—	31
Adjusted diet	52·3	53·2	246·2	1,724
Scale for adult male	100·0	100·0	500·0	3,400
Scale for child 3–6 with adult male = 100	52	53	49	51

APPENDIX I (*continued*).

	Protein gms. daily.	Fat gms. daily.	Carbohydrate gms. daily.	Calories daily.
5. *Children* 2–3. Cathcart Equivalent = 40.				
Original diet	40·8	40·6	208·9	1,407
Add for extra milk allowed (½ pint daily)	9·4	10·2	13·6	188
Total with milk	50·2	50·8	222·5	1,595
Deduct ¼ lb. minced meat weekly (1¼*d.*)	3·0	3·0	—	40
Deduct ½ lb. flour weekly (1½*d.*) ...	3·2	0·5	24·5	119
Deduct 2 ozs. butter weekly (1¼*d.*)	—	6·7	—	62
Adjusted diet	44·0	40·6	198·0	1,374
Scale for adult male	100·0	100·0	500·0	3,400
Scale for child 2–3 with adult male = 100	44	41	40	40
6. *Children* 1–2. Cathcart Equivalent = 30.				
Original diet	39·1	40·1	115·1	1,006
Add for extra milk allowed (¼ pint daily)	4·7	5·1	6·8	94
Total with milk	43·8	45·2	121·9	1,100
Deduct ¼ lb. minced meat weekly (1¼*d.*)	3·0	3·0	—	40
Deduct ¼ lb. cheese weekly (1½*d.*) ...	4·2	5·7	0·5	72
Adjusted diet	36·6	36·5	121·4	988
Scale for adult male	100·0	100·0	500·0	3,400
Scale for child 1–2 with adult male = 100	37	37	24	29

APPENDIX II.

Comparison of Adult Male Equivalent Ratios in Terms of Protein, Fat, Carbohydrate and Calorie Content in (a) *B.M.A. Recommended Diets, and* (b) *Revised Diets, for Children up to* 10 *Years of Age.*

Age of Child.	Standard Ratio to Adult Male.	Protein.		Fat.		Carbohydrate.		Calories.	
		B.M.A.	Revised.	B.M.A.	Revised.	B.M.A.	Revised.	B.M.A.	Revised.
8–10	70	71	72	76	74	68	71	71	72
6–8	60	60	65	57	61	60	62	59	62
3–6	50	50	52	50	53	51	49	51	51
2–3	40	41	44	41	41	42	40	41	40
1–2	30	39	37	40	37	23	24	30	29

In the *Report on the Physiological Bases of Nutrition*, certain standards are laid down with regard to calorie and protein requirements. The recommendations with regard to both are given in a form which makes it difficult to calculate with precision a general standard according to age and sex. For calories, a basic allowance of 2,400 *net* calories is given for an adult with a supplementary allowance per hour of light, moderate, hard and very hard work. It is impossible, therefore, to determine with accuracy a comprehensive calorie allowance for the adult person in general. Given the actual conditions of life and work of the individual in particular, total calorie requirements can, of course, be deduced. For protein requirements, a scale of grammes of protein per kilogramme of body-weight according to age is given. With knowledge of average weights by age, protein requirements can be calculated.

An estimate, however, of daily calorie and protein requirements for the adult male has been made on the following lines.

1. *Calories.* Basic requirement, 2,400 *net* calories; plus an allowance of 110 *net* calories per hour for 6 hours' moderate work—total requirements, 3,060. Allowing 10 per cent. wastage, this represents 3,400 calories, as purchased.

2. *Protein.* The allowance is 1 gm. of protein per kg. of body-weight. Assuming the average weight of an adult male to be 70 kgs., this gives a total daily requirement of 70 gms. of protein. It is inferred that this is a *net* requirement and therefore corresponds to about 80 gms. of protein in food as purchased.

The B.M.A. adult ration yields approximately 100 gms. of protein and 3,400 calories. To adjust this ration to the League of Nations' standard, therefore, requires a reduction of 20 per cent. in the protein content and no alteration in the calorie content. In view of the uncertainty attaching to the calorie requirements of the average adult on the new scale and the very considerable disturbance in the only recent dietary schedule available which would be required to give effect to the new standard, it has been considered advisable to accept the B.M.A. food ration without change except for milk.

It appears to be quite impossible to calculate, with any degree of reliability, the calorie requirements of young children in general from the data given in the League of Nations' Report.

IRISH FREE STATE CENSUS OF DISTRIBUTION, 1933.

By IRIS DOUGLAS.

THE Census of Distribution taken in the Irish Free State in respect of business in the year 1933 is an attempt—the first official one made on this side of the Atlantic—to establish the exact statistical facts regarding distributive as distinct from productive activities. Much less ambitious in scope than the surveys made in 1929, 1933 and 1935 in the U.S.A. and the annual enquiries instituted in Canada in 1930, it none the less provides exceedingly valuable information concerning the number, size and location of retail shops, their personnel and type of management, their stocks and their sales. Since statistics of population, agriculture, manufacturing and transport are already available, the data regarding the economic activities of the Irish Free State may now be regarded as reasonably comprehensive.

A full account of the scope and method of the census, together with tables in which different aspects of the data collected are presented with admirable brevity and clarity, is contained in the report (P. No. 2302) compiled by the Department of Industry and Commerce (Statistics Branch), and published by the Stationery Office in Dublin.

Although all wholesale and retail traders in the country were required to furnish the simple particulars demanded on the census form, not all complied, as was only to be expected in the first survey of such a kind. The response from retailers, however, was very satisfactory, 37,628 shops, or 82 per cent. of the total number, being included in the investigation, and reporting aggregate sales amounting to about £62 million, or £21 per head of population. It is unlikely that the 18 per cent. which failed to render utilizable returns represented anything like that proportion of total retail sales, since they were mostly small businesses not employing paid labour. It is estimated that their inclusion might have brought the figure of aggregate sales up to a level somewhere between £65 and £70 million.

One of the difficulties attending any investigation into distribution is to determine the list of descriptions to which the great majority of establishments can be allocated without ambiguity, and the compilers of this report found that, in the Irish Free State at any rate, retail concerns trading in single well-defined lines of goods are exceptional. They succeeded, however, in drawing up a list of 20 descriptions which proved satisfactory for use in the tabulations dealing with the Saorstát, Provinces and County Boroughs and could be reduced to 15 for counties and large towns and to 4 only for the smallest administrative units. The description "grocery and provisions" included more than twice as many shops as any other, accounted for approximately one-quarter of the total turnover, and occupied about the same proportion of all persons engaged in retailing. Next in importance came drapery, with approximately 16 per cent. of total turnover, but only about 13 per cent. of total personnel. Public-houses dealing in grocery and "other and general shops" each accounted for about 13 per cent. of total turnover. Roughly 13 per cent. of total personnel were occupied in the former kind of business and rather less than 10 per cent. in the latter. Public-houses selling groceries had an average annual turnover of £1,732 and "other and general shops" one of £3,704, the latter being the second highest in the twenty kinds of business listed. Average size of shops, as measured by annual sales, was greatest in the coal business, £4,641. It is interesting that the 10 descriptions of business with the highest turnover per shop include 8 of the 10 with the highest wages, etc., per person paid, and also 8 of the 10 with the highest sales per person engaged. Stocks as a percentage of sales were much higher in jewellery, etc., where their proportion was 72·8 per cent. of sales, than in any other kind of business. Drapery came next with 36·2 per cent. The proportion of stocks to sales was naturally lowest in businesses marketing food and perishables.

A feature noticed in each American census and in various non-governmental investigations into retail business in different European countries is the tendency for a small proportion of the shops to handle a large proportion of the total sales, and this was evident in the Irish survey, for more than half the sales were made by 6·8 per cent. of the total number of shops, those with an annual turnover of £5,000 or more. At the other end of the scale, 48·6 per cent. of the shops had a turnover of less than £500 per annum, and their share of total trade amounted to only 5·9 per cent. It also appeared that not only had the large shops obtained greater sales per person engaged and paid more in wages, etc., per employee than the small shops, but also that these two items varied quite regularly with the size of business.

Another interesting conclusion drawn by the compilers of the census is that most descriptions of business are constantly changing ownership, the rate of change being described as "perhaps one of the surprising results" of the investigation. No less than 23·7 per cent. of all shops had been in their present ownership for less than 5 years, the proportion among Dublin shops exceeding 30 per cent. Longevity of ownership was greatest in grain and forage shops, 20 per cent. of which had been in the same hands for 30 years or more, and only 13½ per cent. had been opened or had changed owners during the last 5 years. Rather surprisingly, the second most stable type of business in this respect was the public-house selling groceries. Such concerns rank about midway in size, as measured by turnover, and 20 per cent. of them had been owned by the same proprietor for 30 years or more, while only 17 per cent. had been owned for less than 5 years. The businesses longest in present ownership were the largest in size, probably because the larger shops tend to be owned by companies, and therefore do not change hands at the death of an individual as do small concerns. Length of ownership is shown to be greater in multiple shops, for 20·6 per cent. had been owned for 30 years or more, as compared with only 13·5 per cent. of independent shops. An analysis according to size of establishment showed that average sales vary regularly with duration. It has frequently been claimed that mortality among small retail businesses is excessive, and the Irish experience seems to lend some support to this contention.

Retail ownership is usually classified as independent, multiple or co-operative. In the Irish census, shops are classified as single or multiple, the majority of co-operative stores being presumably included in the latter class. It is to be hoped that in any future enquiry co-operative trading will be separately distinguished. Multiple outlets were on the average 3½ times as large as single shops in terms of turnover, and handled just over one-fifth of total sales. The aggregate sales of those not owned in the Saorstát were almost double those owned within the country.

The report concludes with a short explanation of the reasons for the insufficiency of data regarding the wholesale trade, particulars of which were returned by 1,419 establishments with a total turnover exceeding £37 million.

The value of such a census to the Irish Free State lies mainly in the use which can be made of the facts revealed to increase efficiency of distribution by substituting the study of those facts and their bearing upon distribution problems for guess-work in marketing policy, and by dispelling erroneous ideas regarding retailing as a profitable field for unskilled management; although, of course, it is also valuable in the light which it throws upon distributive costs and upon the relative importance of retail trading to other economic activities. Outside the Irish Free State its value should lie in revealing differences between retailing there and in other countries; but, unfortunately, in the United Kingdom, where comparison with Irish Free State figures could be useful to manufacturers and distributors of commodities finding outlets in both markets, no comparable figures are available. A frequent ground of objection to proposals for a British census of distribution is that the retailer is unable or unwilling to provide the information required, but there seems no valid reason why he should be less able or less willing here than in the Irish Free State. The *essential* requirements of such a census are even fewer than those obtained by the Irish Free State authorities, and would be satisfied by the enumeration of all retail premises and their classification according to locality, size, type of control and kind of business. The success of this straightforward enquiry into ascertainable facts about each business in a smaller community, and one perhaps less highly organized commercially, should encourage those who seek to persuade the Government of this country that it would be well worth while to make an effort to supplement the meagre information now available about an activity which is estimated to yield half the national income.

THE TWENTY-THIRD SESSION OF THE INTERNATIONAL INSTITUTE OF STATISTICS, 1936.

By A. L. BOWLEY, Sc.D., F.B.A.

THE International Institute of Statistics held its 23rd Session at Athens, September 27th to October 3rd, 1936. The revision of the Statutes and other matters of organization having been settled at the London Session in 1934, the members were able to devote their time to the discussion of the numerous reports and papers presented, of which a list is given below. Owing to the attractions of Athens, the number of members attending was considerably greater than usual, and twenty-four or more countries were represented. There were ten members from the United States, but only two (Bowley and Stamp) from England, to whom we should add Craig (Egypt), Lyon (Ireland), and Nixon (Geneva). There were two innovations in procedure: certain of the Committees of investigation met at Athens the day before the Session, so as to have an opportunity of considering their reports more intimately than by correspondence; an important subject ("Statistique de la Distribution") was introduced and discussed in full Assembly, instead of passing first through the appropriate Section. These changes were experimental, and made with a view to improving the efficiency of the Session.

Owing to a judicious arrangement of the time-table, both of the meetings and of the official receptions and entertainments, all the papers were considered, and in most cases there was nearly adequate time for at least a preliminary discussion of them.

Dr. A. Julin and Sir Josiah Stamp were elected President and Treasurer respectively in place of Dr. F. Zahn and Professor A. L. Bowley. Dr. E. Wagemann was elected as one of the Vice-Presidents, while the others, Huber, Willcox, Savorgnan, were re-elected.

It was arranged that the next Session should take place at Prague in 1938, to be followed by a meeting at Washington in 1939.

There has been considerable delay in the publication of the Reports of former Sessions, especially of Livraison 1, which contains the verbal accounts of the meetings. Livraison 2, "Rapports et Communications," appears more rapidly, and is complete up to and including the London meeting. But Livraison 1 has only recently been received for Madrid (1931). Now we are promised this part for Mexico (1933) and London (1934), and it is hoped that both parts for Athens will be available before the end of 1937.

Meanwhile copies of the communications at Athens have been placed, as on former occasions, in the Library of the London School of Economics.

Reports and Communications at the XXIII^e Session de l 'Institut International de Statistique. Athens, 1936.

Les méthodes de Recensement dans les pays d'Extrême-Orient. M. Huber.
Le calcul des Taux de Mortalité aux âges élevés. M. Huber.
Rapporto sulle statistiche dei Nati Morti e sulla Natimortalità. L. de Berardinis.
Untersuchung über die Todesfälle an Krebs in den grossen Städten der Welt. W. Böhmert.
Observations et propositions pour une statistique internationale du Tourisme. A. Molinari.
Le second Recensement général de la population de la Turquie. Djelal Aybar.
Un indice de Nuptialité. P. Depoid
Le rythme des Naissances. A. Boháč.
Statistik des Geburtenrückganges und der Bevölkerungspolitischen Massnahmen. W. Winkler.
Essential elements for describing the status and trends in the health of large urban populations. Haven Emerson.
La statistique des Migrations Intérieures. Szturm de Sztrem.
La statistique des Migrations et du Tourisme en Grèce. N. Svoronos.
The gain in the Expectation of Life in Greece during the last fifty years. V. G. Valaoras.
Statistiques de la Distribution. A. Molinari.
How to ascertain the definition of some notions which are fundamental to Business Cycle analysis? K. Pribram.
La statistique Forestière internationale. V. Dore.
The 1933 Census of Distribution of the Irish Free State. S. G. Lyon.
Résultats principaux de la statistique de la Répartition des charges d'Impôts en Hongrie. F. de Fellner.
Observations au sujet des indices des Prix et du Quantum, des importations et exportations. Szturm de Sztrem.
Indice de l'activité Financière. P. D. Rediadis.
La prévision des Prix en Grèce. N. Mousmoutis.
Les niveaux des Prix en Grèce par rapport au Revenu National. N. Mousmoutis.
La forme du coefficient d'Impôt fondée sur la statistique. P. D. Rediadis.
La statistique des Faillites au point de vue de l'économie nationale. G. B. Pogus.
Le Revenu Agricole et sa Répartition. C. Evelpidi.
La statistique international des Forces Motrices. M. Huber.
Committee on Family Budgets. Preliminary Report. J. W. Nixon.

Premier Rapport sur l'Organization des Services Statistiques. A. Julin.
Directives pour l'élaboration des statistiques Criminelles dans les divers pays. E. Schäfer.
L'uniformité dans la statistique des Accidents de la Circulation. J. H. Van Zanten.
Observations on the possibility of improving the international comparability of Building and Housing statistics. B. Nystrom.
Enquête sur les Comptes de Ménage aux Pays-Bas. H. W. Methorst.
Sono possibili e utili comparazioni internazionali puramente statistiche sulle Spese di Famiglia e sui Consumi individuali di particolari gruppi sociali? U. Giusti.
L'emploi de la projection cinématique pour l'analyse des faits statistiques. G. Hostelet.
Sur la statistique des sociétés de Gymnastique et de Sports. H. Bunle.
Expériences faites en Tchécoslovaquie au cours des relevés statistiques concernant les Conditions Sociales des Étudiants des Hautes Écoles. D. Krejčí.
L'orientation professionnelle des etudiants en Grèce par rapport à la profession du père. D. P. Razi-Kotsicas.
Die statistische Verwaltung in der Weltstadt Berlin. O. Büchner.
Statistique de la Radiodiffusion. P. J. Idenburg.
Rapport de la Commission d'étude de l'usage du Coefficient de Correlation. M. Fréchet.
Les fondements expérimentaux de l'Analyse Mathématique des faits statistiques. G. Hostelet.
Résumés exhaustifs d'un Ensemble d'Observations. G. Darmois.
Note sur le calcul de la Variation Saisonnière. F. Divisia.
Les applications de l'idée de Chaîne Statistique. O. Onicescu.
Note on a short-cut method for calculating distributed Time-lags. Irving Fisher.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

CONTENTS

	PAGE
1.—*Greenwood* (*Major*) and others. Experimental Epidemiology	103
2.—*Hartog* (*Sir P.*) and *Rhodes* (*E. C.*). The Marks of Examiners	106
3.—*Davenport* (*C. B.*) and *Ekas* (*M. P.*). Statistical Methods in Biology, Medicine and Psychology	110
4.—*Boyd* (*Edith*). The Growth of the Surface Area of the Human Body	111
5.—*Sasuly* (*Max*). Trend Analysis of Statistics	112
6.—*Marbe* (*K.*). Grundfragen der angewandten Wahrscheinlichkeitsrechnung und theoretischen Statistik	112
7.—*Lejeune* (*Jules*). Les Méthodes de Construction des Index-Numbers	113
8.—*Blodgett* (*R. H.*). Cyclical Fluctuations in Commodity Stocks	114
9.—*Harrison* (*Major G.*), *Mitchell* (*F. C.*), and others. The Home Market...	115
10.—Milk: Report of the Reorganization Commission for Great Britain	116
11.—*Milnes* (*Nora*). A Study of Industrial Edinburgh and the Surrounding Area, 1923–1934	118
12.—*Shirras* (*G. Findlay*). Science of Public Finance ...	120
13.—*Sarkar* (*B. K.*). Indian Currency and Reserve Bank Problems	121
14.—*Macfie* (*Alec L.*). An Essay on Economy and Value ...	122
15.—*Rowse* (*A. L.*). Mr. Keynes and the Labour Movement ...	123
16.—Other New Publications ...	124

1.—*Experimental Epidemiology.* By Major Greenwood, A. Bradford Hill, W. W. C. Topley and J. Wilson. Medical Research Council Special Report, Series No. 209. London: H.M.S.O., 1936. 204 pp. 3*s*. 6*d*.

The application of statistical methods to describe the reactions of human populations to epidemics dates back before William Farr to John Graunt, both of whom contributed towards the raising of this branch of medicine to a scientific basis. The discovery of bacteria at a later date and the experimental researches into immunology which followed carried us forward a great distance towards an understanding of the response of the individual host to artificial infection, and laid a foundation for scientific study of the much more complex problem of the response of communities of hosts to natural infection. This latter study, which is essentially a statistical one, has been prosecuted in recent years by field epidemiologists, medical statisticians and others, by careful recording of epidemics of diphtheria, acute poliomyelitis, small-pox, typhoid fever, measles, malaria, whooping cough and some other diseases, and of the effects of interfering with the natural course of epidemics by prophylactic immunization, and by studying the reactions of individuals moving from outside into the communities under observation. So many factors which are capable neither of accurate measurement nor of adequate control are involved in such field investigations, however, that it has proved impossible by these methods up to now to give unequivocal answers to many questions of fundamental importance.

Thus, statistical field epidemiology has suggested that exposure to risk of infection enhances the average resistance of the surviving members of a community by temporarily or permanently producing a higher degree of immunity in them, and not merely by selective survival of the most resistant individuals, but it has been unable to tell us whether this increased immunity will by itself result in the dying out both of an epidemic and of the infecting organism if the entrance of fresh sources of infection is prevented, nor has it told us whether dietetic or other factors are of any importance in raising the average resistance of a community to an epidemic.

Fortunately, another method—that of experimental epidemiology, the recording and statistical study of epidemics experimentally produced in the laboratory amongst communities of animals living under conditions of contact and environment which can be varied and controlled at will—has come to our aid during the last 15 years, and in the capable hands of Professors Topley and Greenwood, with the assistance of their colleagues at the London School of Hygiene and Tropical Medicine, this method has already produced results of the greatest value. Their experiments, in which mice have been exclusively employed, have been described at various times in a series of papers, and are now summarized in a Report of the Medical Research Council under the joint authorship of M. Greenwood, A. Bradford Hill, W. W. C. Topley and J. Wilson. The mice were kept in cylindrical cages of glass or zinc, 10 in. in diameter and 5 in. high, so constructed that any number of unit cages could be fitted together, end to end, producing a composite cage, and the animals, of which between 100,000 and 200,000 have been used in the experiments, were transferred daily to clean and sterile cages. By this technique it has been possible to maintain herds for months or years without the accidental introduction of any extraneous infection. The epidemic diseases which have been studied are mouse-typhoid, pasteurellosis and ectromelia, post-mortem examinations, including cultures from the heart and spleen, being carried out as far as possible on the mice which die. The statistical evaluation of mortality has been mainly in terms of life tables, the unit of time being one day, and zero time the day of entry of the mouse to the herd under examination, and, in addition to the usual life-table constants, two modified constants have been frequently employed, namely, $_5q_x$, the probability of dying during the 5 consecutive days beginning with day x, and $_{60}E_x$, the expectation of life following day x but limited to 60 days, all mice actually surviving this period being credited with 60 days' life from cage age x. The advantages of the latter measure over the unlimited expectation of life are that the disproportionately large influence of a few mice living to, say, 200 or 300 days and the necessity of waiting after the conclusion of the experiment until the last mouse in the herd has died are eliminated. The table below shows for a specimen herd infected with mouse-typhoid and for normal mice some of the life-table constants (extracted from Tables VII and VIII) at 10-day intervals up to 100 days of cage age.

In a final section of 9 pages the authors summarize their conclusions, and these may be briefly outlined as follows. They consider that their experiments have proved for epidemics initiated in herds of mice living in close and continuous contact and subject to continuous or intermittent migration of susceptibles, that:—

The disease will never normally die out.

The form of mortality curve depends in the main on the rate of immigration.

The ultimate size of the herd is mainly determined by the rate of immigration, the tendency being towards an invariant total population with an invariant death-rate.

This condition of equilibrium is fundamentally unstable, and when it is seriously disturbed by some extrinsic or intrinsic factor, the system tends to pass through a period of violent fluctuations before equilibrium is established again at the same or at some other level.

Cage Age in Days x.	Mouse-typhoid Infected Herd.				Normal Mice.
	l_x. (All Deaths.)	$_5q_x$. (All Deaths.)	$_5q_x$. (Specific Deaths.)	$_{60}E_x$. (Specific Deaths.)	$_{60}E_x$. (All Deaths.)
0	10,000	0·0230	0·0139	30·6	56·8
10	9,281	0·1079	0·0994	23·9	57·1
20	6,930	0·2496	1·2408	21·7	56·8
30	3,544	0·2638	0·2556	30·6	56·7
40	2,225	0·1031	0·1455	41·5	58·3
50	1,805	0·0527	0·0499	46·1	58·4
60	1,618	0·0518	0·0416	47·1	58·5
70	1,461	0·0467	0·0428	47·3	58·6
80	1,301	0·0132	0·0132	48·7	58·8
90	1,226	0·0619	0·0169	48·3	58·5
100	1,115	0·0334	0·0334	49·2	59·1

In epidemics initiated by virulent strains of Bact. aertrycke, Past. Muriseptica or ectromelia virus the rate of mortality is very high during the early days of herd life. The expectation of life rises continuously after the 20th to 30th day of cage life towards a level which, while greatly in excess of that of new entrants, never reaches the limited expectation of life of normal mice living in the same environment but not exposed to contact with an infective disease.

Both selection by death of the more susceptible and natural immunization play a part in the increased average resistance displayed by the survivors. Probably the resistance attained by any one mouse after prolonged survival is subject to rather wide fluctuations, and the animal may succumb to the disease in a period of low resistance.

The epidemic waves of mortality do not appear to be due to any fixed cycle of bacterial or virus development, to seasonal or similar disturbances, or indeed to any single determining cause.

The level of mortality in an infected herd, the proportion of immunizing to fatal infections and the degree to which infection occurs are largely determined by the characters of the bacterial strain. Virulence and infectivity vary independently, and variations in these characters are a potential cause of changes in the prevailing type of any epidemic infection, but no evidence is afforded that such variations play a part in the sequence of epidemic waves during any given epidemic prevalence.

Artificial immunization is capable of increasing the resistance of entering mice to a level at which they have on entrance an expectation of life not greatly inferior to that of those survivors which have experienced the full effects of selection and natural immunization, but in no case is the immunity attained complete.

Infection of immunized mice is very common, and many of the immunized and infected survivors appear to be infective to normal mice, so it is doubtful whether infection could be eliminated from herds by artificial immunization, although mortality might be reduced.

Changes in diet have not been found to exert a favourable influence on the course of mortality.

All experiments on the influence of bacteriophage on mouse-typhoid have yielded negative results.

These conclusions are statistically well founded. The authors admit that in any attempt to apply them to similar events in human herds epidemiologists are faced with the difficult and sometimes dangerous argument from analogy, but the history of immunological research has shown that such indirect methods of approach are usually fruitful. This work has at any rate reduced more than one important problem in epidemiology to the question whether what is true of the mouse is true of man, and by so doing has rendered a most important service to that science.

P. S.

2.—*The Marks of Examiners.* By Sir Philip Hartog and E. C. Rhodes. London: Macmillan. 1936. $9\frac{1}{4}'' \times 6''$. xix + 344 pp. 8*s.* 6*d.*

In December, 1935, the International Institute Examinations Enquiry published what the present book calls a summary of the investigations described in it, under the title of *An Examination of Examinations.* This was reviewed in the *Journal* (Vol. cxix, Part II, 1936, p. 380). The new volume enlarges on this preliminary report, and, by means of a memorandum by Prof. Cyril Burt, brings the work into relation with the field of psychological statistics, associated in England with the names of Spearman, Thomson (both of whom are members of the English committee of the Institute) and others, and in the U.S.A. with Thurstone, Kelley and Hotelling (some of the work of the last of whom was referred to by Dr. Irwin in this *Journal* in 1935—Vol. XCVIII, p. 116). Burt's memorandum is very suggestive, and shows wide reading, though it appears that his reading of Fisher has not been used by at least one of the investigators. Dr. Rhodes has developed Edgeworth's idea (this *Journal*, 1888, pp. 599 *et seq.*, 1890, pp. 644 *et seq.* and elsewhere) of a true or standard mark for any unit piece of work. Suppose that this is *a*. Then an examiner will assign to this work a mark of A + d + e, where A is a measure of his general level of marking, d is the deviation by which he estimates the candidate varies from the general level, and e is a measure of the random error of the examiner, by reason of his fatigue and peculiarities of judgment. This omits all reference to the candidate's own fluctuations by reason of the paper not suiting him, etc.: we are simply assessing the script he has produced on this occasion. A and d will give the examiner's standard. The value of d for any a for different examiners may not be the same, and the various values may not be linearly related. Some examiners will be more discriminating than others, some will find differences that do not really exist, some examiners will give a greater excess to good candidates than the others, while others "add marks to all but the very good" (para. 295), etc.: the range and distribution of the deviations will vary from case to case. The random error e is a measure of other fluctuations and it may be that included in this are fluctuations due to the examiners marking for different features, so that their ideal rankings, even if there were no fatigue effects, etc., would not be the same. The supporters of literal marking would probably claim that the quality that they seek in scripts is not measurable. The Committee give for the first time an estimate of the relative importance of these various elements in the numerical marks assigned by examiner to scripts. The report is padded out with a large amount of more or less anecdotal matter; the fluctuations in marking bits of questions are of course wide, but in a well-atomized question-paper will largely average out. They will not completely average out, so that two markings will not correlate +1, and, in so far as they do not, we shall get distortions of relative rankings, as anyone who has seen a correlation table would expect (*vide*, "Selection by a Nearly Perfect Examination," *Annals of Eugenics*, Vol. vii, part 1, pp. 65–85, 1936). The work of the first 250 pages or so can be summarized in the following table, which indicates the relative importance of the various features already referred to.

We note that the table indicates how the different examiners take different levels of marking, even when there has been a standardizing procedure and a detailed schedule of marking, how the candidates really differ among themselves, and how the examiner varies from his standard in the course of his marking. In the case of mathematics the difference between the candidates is the most important cause of differing marks assigned to them, d being much greater than c or e. In the case of English Essay (Case L) the difference between the candidates may be readily masked by the difference between the differing standards of the examiners and by their random variations. Cases A and B, as might have been expected, indicate that for candidates approximately of equal merit the examiners will, by reason of their differing standards of marking, find it hard to get a proper ranking of the scripts. By the use of boards of examiners and other precautions very closely corresponding rankings for chemistry (para. 458) and for Latin (para. 490) are obtained, and the report comes to the conclusion (para 500) that the discrepancies between the examiners are mainly due to their different

TABLE I.

	Examination.	*a.*	*b.*	*c.*	*d.*	*e.*	*f.*	Remarks.
A	Sch. Cert. History	15	15	16	6	5	3, 9	Scripts all of same original middling mark; no instructions; marking repeated after a year.
B	Sch. Cert. Latin	15	15	16	4	2	20	Scripts all of exactly the same original mark; maximum 350.
C	Sch. Cert. French	50	12	8	16	2½	38	Scripts originally roughly normally distributed; about 1,000 detailed marking instructions.
D	Sch. Cert. Chem.	30	12	17	19	4	54	Scripts originally normally distributed.
E	Sch. Cert. English	48	7	15	6	4	—	" Durham " Experiment. Bits of 6 questions to be done out of many bits of 21 questions.
F	Spec. Pl. Essay: Impression	75	10	28	*g*	8·4	121	
G	Spec. Pl. Essay: Details	75	10	13	*g*	7·9	121	
H	Spec. Pl. Awards	150	10	—	—	—	114–16	
K	Maths. Hons.	23	6	3½	20	4	149	Original maximum 300. Do about 6 questions out of 12.
L	Entr. Schol. Essay	50	5	4	10	7	113	One of four topics; A chosen by 10, B by 8, C by 11, D by 21.
M	Hist. Hons.	18	17	See note *h*			156–62	
N	Viva Voce	16	9	See note *k*			172	

Notes.

a, Number of candidates or of scripts selected for investigation.
b, Number of examiners (sometimes assistants in two boards) chosen from those experienced in type of examination investigated.
cde, Marks out of, maximum of, or reduced to, 100.
c, Range between Average Marks awarded to the *a* scripts by each of the *b* examiners.
d, Average S.D. of marks of any one examiner, or Mean Deviation, or S.D. of Ideal Marks. (These are, of course, not the same, but the values are sometimes given in one form and sometimes in another.)
e, S.D. of Examiner's Random Variations (average order of magnitude).
f, Page of report giving double entry tables of marks of all (or some) candidates and all examiners, in some cases after adjustment. Previous investigators (*e.g.*, Boyd, Perrie Williams) have not published their results in this form (see *British Jl. of Educational Psychology*, Vol. V, Pt. II, p. 184, 1935): even now the Durham Expt. figures are not given, although specially asked for, in the A.M.A. (May, 1932, pp. 100, 102).
g, Average of S.D. of examiners' distributions = 16·0, 16·0; S.D. of Ideal Marks = 14·1, 13·9.
h, Literal marking in 21 grades from alpha plus to delta: *c* is 7 of these grades for range of median. The ratio of the random variation of examiners' marking to the natural variation of the candidates varies from 0·58 in one case to 4·31 in another.
k, The candidates were 15 to 20 minutes with each of two boards. They were marked each time to 300. The correlation between marks of the two boards were 0·41; between individual examiners and final award of the board from 0·63 to 0·91. The method of the standardized interview does not seem to have been used.

standards of marking, rather than to their introduction of random variations in the marking. This point can be put another way. In the Special Place investigation it was found that if we seek the best 50 out of the whole 150 candidates, then only 73 candidates are so regarded by one or other of the 10 examiners, and that all of them agree on 33 of the number. These various agreements about rankings should be a matter of considerable satisfaction to the big examining bodies, for their procedure is such that this feature of fluctuating standards is usually corrected, to a considerable extent, before marks are published. The same fact about differing standards should, however, warn the writers of the report that they will in practice find it hard to determine any clear-cut level of any utilizable skill (para. xviii), and that the distinction between qualifying and competitive examinations is by no means sharp.

We may regret that the investigations used such very small samples of scripts. They were taken from big examinations. In the School Certificate an examining body may deal with ten or twenty thousand scripts in any one subject, and an assistant examiner will mark six or eight hundred : in Special Place examinations there may again be many tens of thousands of scripts, and an assistant examiner will deal with perhaps 2000 of them. It is therefore unfortunate that the basis of the report should be on samples of 15 or 30 scripts, and the work would have carried more weight had bigger numbers been used. It is further unfortunate that the investigations did not cover the question of alternative questions in examinations. It appears that the Committee could have worked this point out from the material that they had at their command: we are told (para. 311) that it seems that individual examiners tend to mark higher in one subject than another, so that a candidate may be handicapped by an unlucky choice of subject (Exam. L, a small experiment—see Table I).

Special attention should be called to the 60 or more pages that are devoted to an investigation into the S.P. English examination. There is contained in it an enquiry into the relative merits of detailed marking and marking by impression. It seems most unlikely that the experiment was devised by anyone who had any knowledge of the work of Fisher on the design of experiments, for it is hard to imagine that any scientifically trained worker would have attempted this by giving 75 scripts to each of 10 examiners to mark by impression and another 75 to the same examiners to mark by what is called details (although as a matter of fact only half of the total maximum warrants this term, for the other 50 per cent. is available to be given in a lump sum). A great deal of analysis is given, but the full double-entry tables are missing. From the tables of marks of every fifth candidate (p. 121) we can obtain the following table.

TABLE II.

Between.	Degrees of Freedom.	Mean Variance.		
		Impression.	Details.	Details (scaled).
Examiners	9	986	354	200
Candidates	14	1,986	2,757	1,555
Residuals	126	83	70	39

The Residuals item will, it is suggested, contain, in addition to variance due to random errors and higgledy-piggledIness, interactions due to differing responses of examiners to candidates' attitudes (styles, temperaments, handwriting, etc.). It seems that in the full table from which that on p. 121 is taken, Stephenson's recent extension of factorial analysis (*Brit. Jl. of Psychology*, Vol. XXVI, Pt. 4, pp. 344–361, 1936) would indicate the existence of these last.

The last column is obtained from consideration of the fact that the general level of marking in the impression case is only 75·1 per cent. of that for details (44·4 in place of 59·2). It seems, then, that we are forced to the conclusion that by marking by details, the variance of the examiners compared with that of the candidates is reduced from one-half to one-ninth (or, alternatively, the difference for examiners' variance in the two cases is at about the 1 per cent. point of significance), and that the variance for random fluctuations is also significantly reduced. Yet the report states (para. 260) that the element of random marking has, roughly speaking, the same magnitude in both cases, and that (para. 265) the method of marking by impression and the method of marking by details produce on the average the same degree of discrimination between the different candidates. The proper conclusion seems to be that marking by details, even in the crude fashion of the investigation, makes the differences between the candidates relatively the more important. We must, of course, bear in mind that it does not follow that marking by details really marks properly an essay: these marks may not be valid. But the other method cannot be valid if it is not reliable, as the report points out in other connections several times.

The report of all this work is therefore unsatisfactory in many ways, both in the matter of procedure and of presentation. Yet the volume will remain an important one. Its criticisms must be met in any examination, and its practical suggestions, as, *e.g.*, that of paras. 662 and 669 that at the end of any examination there should be a further test of standardization of, say, 30 scripts, by the examiners in the marking team, will help towards making examinations a more accurate measure of the scripts submitted than they have been in the past.

F. S.

3.—*Statistical Methods in Biology, Medicine and Psychology.* By C. B. Davenport and Merle P. Ekas. New York: John Wiley and Sons, Inc., 1936. 7″ × 4″. xii + 216 pp. 13*s*. 6*d*.

This is the fourth edition of a book by Davenport which was first issued in 1899. In reviewing the work, the authors' description of it in the preface to the first edition—"a handbook containing the working formulæ"—must be borne in mind. The book consists of brief explanations of a wide variety of statistical methods, with details of the arithmetic involved and tables, where necessary, to assist in the application of the method and to provide tests of significance. Practically no instruction is given as to which method to use in any particular problem.

Chapter I deals with variation and its measurement, and describes, with illustrations, various useful types of measuring instruments and calculating machines. Chapter II deals with the graphical representation of data and the various measures of the mean and of the dispersion about the mean. Chapter III describes the common types of frequency distribution in use, in particular the Pearson series of curves. A brief note on the analysis of variance follows (Chapter IV). Total and partial correlation and linear regression are treated in Chapter V. The remainder of the book deals with special applications:—to Mendelian analysis, growth and index numbers. The book concludes with an explanation of the symbols used and a very useful set of tables.

The statistical methods which are being used in biology, medicine and psychology to-day differ greatly in their efficacy and power, and the same criticism necessarily extends to any book which merely claims to give working instructions for those methods which have been recommended, without a critical estimate of the worth of the methods. Thus certain of the methods and statistics described are rapidly falling into disuse. In particular, it is unfortunate that the exact treatment of 2 × 2 and other contingency tables was not included; the treatment given is laborious and only approximate. More space might have been given to the many applications of the analysis of variance.

The book is of a handy size and the explanations given are easy to follow and apply. W. G. C.

4.—*The Growth of the Surface Area of the Human Body.* By Edith Boyd. The University of Minnesota Press, 1935. London: Humphrey Milford, The Oxford University Press, 1935. $10\frac{1}{4}'' \times 7''$. x + 145 pp. 22*s.* 6*d.* net.

For such as are interested in a knowledge of the surface area of the human body and of the rate of areal growth from fœtus to full-grown adult, this book will prove an exhaustive summary of research up to the present and a careful analysis of methodology and degree of error. The author describes the various methods which have been employed for measuring or estimating the area of the human body and the different values yielded by them. The methods include coating the body with various substances, such as tin-foil or paint, and estimating the quantities used; the use of pelliplanimeters; methods of triangulation, or marking off regular geometric figures on the body and calculating their areas; and methods based on the similarity of parts of the body to geometric solids whose surface area may be calculated from their linear dimensions.

The results obtained by these various methods are carefully analysed, and the author comes to the conclusion that the surface area of the body may be measured with an error of less than 3 per cent., individual variations in measuring having more weight than differences in method.

Various formulæ for equating surface area to functions of height and weight are also examined and tested by an analysis of the inter-relations of 231 sets of measurements. The conclusion is reached that the relation of surface area to height may be adequately represented graphically, but not algebraically, whilst the relation of surface area (S) to weight (W) may be represented by the equation

$$S = 4{\cdot}688\ W^{0{\cdot}8168 - 0{\cdot}0154 \log W}.$$

Relation to weight and height (H) throughout life may be represented by the equation

$$S = 3{\cdot}207\ W^{0{\cdot}7285 - 0{\cdot}0188 \log W}\ H^{0{\cdot}3}.$$

These two equations probably vary between ± 16 per cent.

and ± 14 per cent. respectively, and thus invalidate their use for prediction in an individual case. The variation is probably accounted for largely by the varying gaseous content of the body.

Great pains have been taken by the author to colligate and evaluate all available research on the subject, and the book should prove a reliable statement of the present position. E. G. C.

5.—*Trend Analysis of Statistics: Theory and Technique.* By Max Sasuly. Washington, D.C.: Brookings Institution, 1934. 9½" × 6". 421 pp. $5.

This is a highly specialized mathematical book concerned largely with the fitting of polynomial equations to series of data spaced at equal intervals of the independent variable. Occasionally the author treats briefly of some other type of equation or method of smoothing, but the bulk of the book deals with the polynomial type.

The polynomial equation is expressed in almost every conceivable way: as a power series, as a series of fitted values, as a series of differences of fitted values and as a series of orthogonal functions; the properties of, and relations between these forms of expression are fully dealt with. The parameters used in the various forms are estimated by the method of least squares, and it is shown how they may be computed, from the raw data as a series of weighted means, from the differences, from the moments, or from the "factorial moments" determined by successive summations of the data. The results are applied to the development of methods of smoothing, interpolation and quadrature, and several well-known formulæ and methods find their place in the general scheme.

Some attention is paid to the measurement of the closeness of fit of an equation, but the treatment of this part of the subject is old-fashioned and less satisfactory than the rest of the book. The correlation coefficient between the fitted and actual values and the mean square of the residuals are deduced in terms of the parameters, but no variance is estimated after allowing for degrees of freedom absorbed in fitting, and so there are no criteria for testing the significance of the trend.

Apart from the above omission, the book appears to us to be theoretically exhaustive and comprehensive, although some reader with more special knowledge may find other omissions. Certainly there are copious references to every writer we can remember who has written much on the subject. However, particular emphasis is laid on methods of computation suitable for use with a modern listing-adding machine, and these provide a focus for much of theoretical work. Schemes of computation are developed, examples are worked out, and useful tables are given. L. H. C. T.

6.—*Grundfragen der angewandten Wahrscheinlichkeitsrechnung und theoretischen Statistik.* By K. Marbe. München: C. H. Beck, 1934. 177 pp. 8 Rm.

This book is not, as its title may suggest, a general treatise on fundamental aspects of statistics. It is devoted entirely to a defence of a theory held by the author that the application of the binomial series distribution to the results of a number of repeated trials has little validity, because in practice repeated trials are rarely independent. His empirical justification for this view is an examination of records of sex in the birth registers and of runs of red and black at roulette, to show that long runs of consecutive events of the same type occur less frequently than is to be expected on the hypothesis of independent and equal chances at each trial. He uses the interesting result, proved by him elsewhere, that if the chance of success at a trial is p, the expected number of runs of r consecutive successes in n independent trials is

$$f_{n,r} = \left\{\begin{matrix} 2p^rq + (n-r-1)\,p^rq^2 & 1 \leq r \leq n-1 \\ p^r & r = n \end{matrix}\right\}$$

Unfortunately, the author's method of fitting the expected distribution is not correct, and no test of significance of the departure of observation from hypothesis is made. In fact, his data on sex distribution show no abnormal deviations after correcting for the effects of twin births. The distribution of runs of red and black at Monte Carlo roulette cannot be considered as a random sequence, as K. Pearson showed for a set of data in 1897, but here again Marbe's handling of the data is open to criticism.

Marbe's theory, when first stated by him in 1916, met with opposition from other German writers on probability, and the remainder of the book is devoted to replies to their attacks.

To beware of glibly assuming the independence of repeated events in his data, especially in sociological data, is excellent counsel to the statistician; but the author fails to establish his general principle.

W. G. C.

7.—*Les Méthodes de Construction des Index-Numbers.* By Jules Lejeune. Paris: Recueil Sirey, 1935. 9¾″ × 6½″. 254 pp. *12s. 6d.*

The title chosen by Dr. Lejeune is a little misleading. The book consists of a simplified account, in many ways an over simplified account, of the general methods of constructing price index-numbers. There is no attempt to consider index-numbers other than those of prices or to solve the special problems raised by other index-numbers. Nor do we find the study which so many of us would welcome, a comparative study of the nature, contents and construction of the actual index-numbers in use in the principal countries. The scope of Dr. Lejeune's account can be briefly indicated. He describes, first, the nature of price-index numbers in general terms, the distribution of individual prices and the relation of wholesale to retail prices. This is followed by a lengthy discussion of the main practical points to be considered in constructing a price index-number, the problems of the choice of base year, of the specification of the prices to include and the methods of obtaining the prices, of the selection of appropriate averages and weighting systems being dealt with in turn. The discussion includes a fairly detailed summary of Prof. Irving Fisher's well-known book on *The Making of Index Numbers* (1922). Index-numbers current in Belgium are used for illustrative purposes, and a concluding chapter is devoted to an elementary correlation analysis of the Belgian retail price and cost of living index-numbers. A bibliography is appended.

There are some remarkable omissions, even when due allowance is made for the elementary nature of the treatment. Authorities writing in languages other than French or English are almost entirely neglected with the result that the important contributions, for example, of Haberler, Bortkiewicz and Konüs receive no mention even in the bibliography. Further, no reference is made to the International Labour Office study on *International Comparisons of Cost of Living* (1934) or to more recent work by Dr. Staehle on cost of living index-number construction. In this latter field, the theory and technique have been extended, in the past few years, in a new and most profitable direction. Much of what Dr. Lejeune says, at least as far as cost of living index-numbers are concerned, must necessarily appear out of date to the expert without being really suitable for the general reader to whom the book is addressed. It is time to recognize that statisticians have broken the bounds set by Fisher's "ideal" index-number. R. G. D. A.

8.—*Cyclical Fluctuations in Commodity Stocks.* By Ralph H. Blodgett. University of Pennsylvania Press & Humphrey Milford, 1935. 9″ × 6″. 177 pp. 11*s.* 6*d.*

At the time the United States Census of Distribution was taken in 1929, it was found that the value of stocks held by retailers was 5¼ milliard dollars, by wholesalers 7¼ milliard dollars. Evidence was available to show that stocks held by producers were probably at least as great as, if not greater than, stocks held by retailers and wholesalers. The national income in that year was 83 milliard dollars, so in all over 30 per cent. of the national income was held, at any one moment, in the form of stocks—an unexpectedly high figure. Since 1929 it is possible that this proportion has been reduced, but in any case it is clear that very large quantities are involved, and an analysis of the factors involved in causing movements of stocks is obviously worth while.

Mr. Blodgett confines himself to an analysis of stocks in the hands of manufacturing producers, for which data are far more plentiful than for stocks held by traders. He analyses in great detail movements in manufacturers' stocks of eleven raw materials and twenty manufactured products over the period 1919–32. He divides this period into four trade cycles. The certainty and sharpness with which he specifies the beginnings, turning points and ends of these cycles may appear surprising to English readers. He is following carefully, however, the methods of cycle analysis used by Prof. Wesley Mitchell and Dr. Kuznetz, and in the reviewer's opinion he is justified. His turning points are as follows:

	Beginning of Cycle (Trough)	Turning Point (Peak)	Conclusion (Next Trough)
1st cycle	April 1919	January 1920	September 1921
2nd cycle	September 1921	May 1923	July 1924
3rd cycle	July 1924	October 1926	December 1927
4th cycle	December 1927	June 1929	September 1932

The author is working, of course, on seasonally corrected data.

The first and fourth cycles are old friends to English readers, and practically without modification of date, can be described as having been world-wide. The second and third were of more purely American concern and may be described as fluctuations of a minor degree. But none who studies American price and production statistics over that period can deny their existence.

The author then examines in very great detail the movements of individual series in comparison with the "reference cycles" of general business activity. He soon divides commodities into the two classes of those which are held as "Disparity Stocks" and those which are held as "Convenience Stocks," the stock-statistics of the former types of goods showing inverted association, the latter showing positive association, with general business activity.

The latter type are more numerous and important. It is shown that Disparity Stocks are generally confined to raw materials of the type which do not deteriorate physically in storage, and are not subject to changes of fashion or style, such as woodpulp, crude petroleum, ore, wheat and cotton.

Among manufactured goods, though the evidence is open to certain qualifications, newsprint, cement, baths, zinc, flooring, cotton hose and certain other goods show "Disparity Stocks," *i.e.* stock movements negatively associated with general business conditions. Goods subject to fashion changes, to deterioration in storage, or goods of great variety of lines, show positive association, among them underwear, book paper, chilled pork, motor tyres. But facts by no means always confirm theory, and a number of unexpected products, such as alcohol, petrol and sugar, are also found in this group.

Retail stocks, so far as English figures go, seem to be very definitely of the Convenience Stocks type.

Mr. Blodgett makes an unsuccessful attempt to secure statistical comparison of stock movements with price movements, but succeeds in getting some very interesting results about the lead or lag of stock movements in comparison with changes in general business conditions. Stocks of raw materials show a tendency to lead, while the figures for manufactures, on the whole, show a slight lag.

This is a careful, thorough and scientific study of a subject on which very little is yet known. The author has also reached conclusions which will cause many statisticians and monetary theorists to revise opinions which they have previously held.

C. C.

9.—*The Home Market.* By Major G. Harrison and F. C. Mitchell, and the statistical staff of the London Press Exchange, Ltd.; foreword by Frank Pick. London: Allen and Unwin, 1936. 10½" × 7¾"; xv + 149 pp. 10*s.* 6*d.*

The basic purpose which this publication is intended to serve is concisely indicated in the introduction, where it is stated that the concern which sets out to sell its products to every family in the land can no longer rely on rule-of-thumb methods. In order to give the salesman an intelligent conception of his actual and potential market, a wide range of social and economic statistics has been presented in twenty-one sections.

The first eleven sections deal with the demographic characteristics of Great Britain. The age and sex composition of the population are given by regions, and the rural areas are clearly distinguished from the urban centres. Those who are planning their production or marketing programme for several years ahead will find particular interest in the section which compares the present and estimated future population of Great Britain for 1941, 1951 and 1961. The expected change in the age distribution is very clearly brought out.

Section 12, the longest of all, requires special mention. It is devoted to the division of the population in 1934 into three "social grades," defined as where the chief earner receives weekly (*a*) £10 or more, (*b*) £4–£10 and (*c*) below £4. These estimates are given not only for counties, but also for certain large towns. There must necessarily be an unknown margin of error in these calculations, and the effect of subsidiary earners must be considerable. The caution concerning town statistics (p. 66) is certainly not out of place.

The incidence of poor relief and unemployment provide indices of purchasing power and the section dealing with the distribution of the national income and wealth for 1934 (based on Mr. Colin Clark's estimates for 1931) is logically followed by estimates of the national expenditure (based on Mr. Feavearyear's work). The table in section 20 giving income and expenditure in detail for sample families may imply a more accurate knowledge of the spending habits of certain classes than in fact exists. It appears that the difference between the total average weekly expenditure and the housewife's weekly expenditure (shown in detail and including rent and rates) diminishes as income increases; no explanation of this is given. The final section is devoted to the regional distribution of the daily and Sunday press throughout the country. An appendix on current statistics of commercial interest, and one on the statistical methods employed, together with an index, complete the book.

The object of this work is admirably achieved. There is no longer any excuse for the manufacturer or the salesman of consumers' goods to remain in ignorance of the circumstances that largely determine his market. If he is unaware of the original data or dislikes their appearance, he now has available a mass of material in a form which is easy to read. Official and non-official statistics have been presented in an easily digestible form, and even the unyielding scientific reader must find it difficult to resist the many pictorial diagrams which illustrate the figures. R. F. G.

10.—*Milk: Report of the Reorganization Commission for Great Britain.* Ministry of Agriculture, Economic Series, No. 44. London: H.M. Stationery Office, 1936. 362 pp. 1*s*. net.

This Report foreshadows a further stage in that drastic transformation of the milk industry, which has been proceeding apace in the last few years. Up to 1922, the milk supply of this country remained entirely a matter to be settled by private initiative on the basis of supply and demand, but in that year cut-throat competition threatened to be so severe that producers combined to organize a species of voluntary control for their mutual benefit. The optional nature of this scheme made it only partially successful, and it was succeeded in 1933 by the Milk Marketing Boards, which made compulsory the regulated buying and selling of milk and the pooling of the proceeds among the producers. Now, in the view of the Commission, questions of public health and nutrition, and the interests of consumers, as well as the ultimate well-being of agriculture demand a larger measure of control.

They recommend the establishment of a permanent independent and impartial Milk Commission as a Central Authority for the industry, who would advise the Government and plan a production policy capable of meeting the nation's needs, frame measures for stimulating the consumption of liquid milk, and be responsible for promoting the general progress and welfare of the industry. The Milk Marketing Boards (representing the producers) would remain and would continue to exercise most of their executive functions, but the prices to be paid, which are now settled by the Boards, would in future be determined by the proposed Commission. A fundamental principle is involved in this, viz. that price control should be used as an instrument for promoting a planned policy not only in the interests of producers but of the community as a whole; and that as price is the vital factor influencing production, distribution, manufacture, and consumption, its control should rest in impartial hands and not in those of one of the interested parties.

It is pointed out that " the present form of marketing organization in the milk industry undoubtedly leaves other sections of that industry—and tends to leave the general public also—with the impression that the interests of producers are allowed to transcend all others." It would be unfortunate, the Report goes on to say, " if it should continue to appear that terms can be imposed by one section of the industry upon all other sections and upon the general public: for that could only foster a spirit of antagonism and unrest."

The creation of this new central authority may possibly be criticized by milk producers who will fear a reduction of some of the privileges they have lately enjoyed, but from any other point of view the equity of the recommendation can hardly be denied. If effect is given to it, questions of social welfare and national policy can be considered along with purely commercial interests.

A recommendation which may, perhaps, receive less general approval is that the Government should provide financial assistance to encourage the consumption of liquid milk. At present, considerably more milk is produced than can be sold for liquid consumption at current prices and the surplus has to be sold for manufacturing purposes at a much cheaper rate, the price actually received by the producer being in effect the average of the two. The Commission take the somewhat novel view that the present price of liquid milk to the consumer is raised by reason of the loss on the manufacturing milk; in other words, to secure to producers the price they in fact receive the price charged for the milk sold for liquid consumption has to be high enough to make up for the loss on the manufacturing milk. On the assumption that increased milk consumption is a matter of national importance, the Commission recommend that the State should provide funds to allow milk to be sold to selected classes of the consumers at specially reduced prices, and should also bear the burden of the loss on the milk used for manufacturing purposes, the estimated amount required being about £5 millions in all. The consequential reduction in retail price would amount to about 4*d.* per gallon for three months in the year. It is also suggested that the practice of fixing retail milk prices should be abolished, and charges left to be settled by competition. This, it is thought, will lead to a reduction in many districts particularly in rural areas.

There are, of course, large numbers of other recommendations in this massive report, but they are mainly of concern to the industry itself, whereas the points of principle referred to above are of interest to the general public. It is worth noting that the powers which it is proposed should be given to the new central authority are, in some respects, more extensive than those yet enjoyed by any other public body. R. J. T.

11.—*A Study of Industrial Edinburgh and the Surrounding Area, 1923–1934.* Volume I. By Nora Milnes, B.Sc. London: P. S. King and Son, Ltd., 1936. 8¾″ × 5½″. vii + 270 pp. 12*s.* 6*d.*

In recent years surveys have been made of areas where the effects of the industrial depression have been heavily felt. The survey of the Edinburgh district is stated to be in the nature of a "control" experiment, the area being one to which the title "industrial" would not be applied. The aim was to discover how this area "had been affected by the depression, and what possibilities there were, by the wise development of its industries, of giving some relief through affording employment to men from other more seriously affected districts." Owing to lack of adequate funds and of sufficient skilled assistance the survey has not been so comprehensive as it otherwise would have been, but nevertheless a considerable body of information has been packed into this volume.

In her introductory chapter the author points out that, whether Edinburgh be industrial or not, "the welfare of many is bound to depend very largely upon its industrial prosperity" and adds "that industrial development could go much further seems obvious to the onlooker, for here is an area with easy access to mines, and thus in a privileged position in obtaining power; a port at hand well situated for trade with many parts of Europe; certain natural advantages in regard to water which assist such industries as paper-making and brewing; and a long tradition for high-class quality of work, with at least one specially local industry, printing."

The volume is arranged in two parts. The first opens with two chapters dealing with the population in 1931, grouped according to occupations and industries, in the city of Edinburgh and the area outside the city respectively. There follow two chapters devoted to the employment position as shown by figures obtained from the Employment Exchanges. These chapters are succeeded by one describing the industrial structure of the area, and a chapter on the general position in regard to juveniles. Part II consists of short studies of special industries (transport, building, printing, papermaking and stationery manufacture, brewing, rubber, laundries and coal-mining).

Employment statistics and charts relating to each of the years 1923–35 are given for industries as a whole. For individual industries, however, they stop short at 1932. The figures are analysed critically, and employers in the area would do well to ponder some of the conclusions arrived at by the author. For example, "In Edinburgh there seems to be at least one outstanding example of a wage-rate which is unduly high—that prevailing in the printing industry. The rigidity of the agreement prevents the employment of lesser skilled men at a lower wage-rate such as is accepted and recognized by printers in many districts in England, and as a result the area is prevented from developing the cheaper side of printing." And again, "If small firms, obviously unable to take advantage of various economies made possible by the larger concerns, are hampering the development of the city, should not this be generally recognized and ordered plans be made to eliminate wasteful effort and thus generally to increase the productive capacity of the area?" This question has, of course, an application much wider than to the Edinburgh district, but it serves to illustrate the attitude of mind which Miss Milnes has brought to her task.

For the purpose of instituting comparisons between certain industries, as carried on in the Edinburgh district and in other areas, the author has made frequent use of the Census of Production reports. Her opinion on the value of the Census of Production figures will meet general approval. "A census of production will prove an expensive luxury if it be merely used as the happy hunting-ground of the expert statistician. But if it be used for the practical purpose of discovering which industries are best suited to which areas, what industrial unit is best suited to different branches of industry, what net output should be expected from different units, then indeed the labour entailed in compiling it will have been more than worth while. The question is, Is it being used in this way, or are not our industrial leaders inclined to think that since business is their business, they naturally know most about it?"

The author has based certain arguments on the Census of Production figures, but she seems to have overlooked an important point in the case of the brewing trade, where the net output in 1930 per person employed was £748 for Great Britain and £417 for Scotland. The suggestion is made that this striking difference may arise in part from a comparatively large proportion of small firms in the Scottish brewing industry, and the author proceeds to elaborate this argument. But net output includes excise duty, and if, as appears probable, a comparatively large proportion of beers brewed in Scotland was exported from bond, duty free, and a comparatively large proportion of those brewed in England and Wales was for home consumption, the major part of the difference between the figures may be accounted for thus, and the author's argument becomes considerably weakened.

In the case of the printing trade, the net output per head of persons employed, in a district which includes Edinburgh, was £194 in 1924 and £197 in 1930, and it is argued from these figures that apparently "costs of production" fell between 1924 and 1930. It seems to have been forgotten that rent, advertising and sales expenses are costs of production which are included in the net output figures. The difference between 1924 and 1930 is anyhow so small, and "net output" includes so many items besides wages and profits that it is rather hopeless to attempt an explanation of the probable reason for the difference.

Notwithstanding that here and there Miss Milnes has built conclusions on rather weak statistical foundations, her book is to be heartily commended, not only for the interesting body of facts she has collected, but for the able manner with which she has marshalled them and for her well-reasoned analyses of the statistics which were available to her. J. W. V.

12.—*Science of Public Finance.* By G. Findlay Shirras. London: Macmillan, 1936. 8½″ × 5½″. xliv + 1,146 pp. (2 vols.) 42*s.*

This is the third edition of a work already known to a wide circle of readers. It is not a mere reprint, but has been enlarged and largely re-written, with the avowed aim of re-surveying the whole field of public finance with special reference to the results of recent speculation and the application of the principles to actual conditions. It is therefore a little surprising to read the emphatic assumption that "what is required most of all at the present time is more and more thrift, as this is essential to prosperity." On the practical side there are innumerable illustrations of tax administration, but there is no mention whatever of the tax system in Russia, and one wonders whether a study of the abnormal conditions in that country might not have thrown a little more light on many problems, particularly, perhaps, that of so-called taxable capacity.

The work contains much interesting descriptive matter, but the author is not so satisfying nor so exhaustive when he passes to the more theoretical aspects of his subject, and at times is likely to leave the reader a little confused. Take, for instance, his treatment of the theoretically equitable bases of tax distribution. After telling us that "the equality of sacrifice cannot be accepted as the basis of the ability to pay, because it is not possible to measure the inconvenience or hurt caused to the taxpayers individually" (p. 306), but that a finance minister, in deciding whether to increase indirect taxation or to steepen progressive direct taxation, "at any rate follows the principle of minimum sacrifice" (p. 313), he declares that "the principle of minimum or least aggregate sacrifice is, as Edgeworth has said, the sovereign principle of taxation, which requires no doubt to be limited in practice" (p. 309), but that the "fairness or unfairness of the burden will depend, all things considered, on the least aggregate sacrifice made by the taxpayers, when the taxes are paid " (p. 308)! Elsewhere, however, he declares that regressive taxation is not inequitable (p. 299), that " it is indeed an ideal of taxation when all classes pay their share to the State " (p. 308), that " the steepness of progression cannot be carried too far as it would then be unfair against the higher incomes " (p. 299), that proportional taxation in theory and practice has in recent years been proved to be more arbitrary than progressive taxation (p. 217), and that " both proportional and progressive taxation may be based on the criterion of ability and both may claim to be the ideal mode of apportionment " (p. 309). Such eclecticism is apt to be a little perplexing.

The most interesting part of the work is perhaps Book V, which deals with financial administration in its numerous aspects. A number of useful tables and a complete index conclude what is probably the lengthiest and most detailed work of its kind in the language. C. O. G.

13.—*Indian Currency and Reserve Bank Problems.* By Benoy Kumar Sarkar. Calcutta: N. M. Ray-Chowdhury & Co., 1934. 9½" × 6". ii + 84 pp. *Re.* 1.8.

This is a collection of a number of contributions made by the author to financial and technical journals in India on economic topics of current interest during the last ten years. It is well known that Professor Sarkar, who has travelled and studied widely in Europe and America, holds views on politico-economic problems now facing his country not identical with the strongly nationalistic opinions of many of his countrymen. In the present little book, the author has, for instance, put forward, with considerable force and statistical support, the argument that the amount and rupee-value of India's experts (mainly agricultural) are not necessarily dependent upon the rate of exchange. Since it is certain that the relation between Indian currency and sterling will be a matter of renewed controversy as soon as world monetary conditions are stabilised (there is a specific provision to this effect in the Reserve Bank of India Act), it is all to the good that dispassionate attention should be given to such questions from now. Similarly Professor Sarkar has pertinent observations on the subject of the export of gold from India in recent years. However much one may regret that, owing to the export, this quantity of gold is no longer available for much-needed economic development in India, it is, as the author points out, only a fraction of the quantity of gold imported into India since the beginning of the twentieth century.

Professor Sarkar's opponents might also be reminded of the fact that but for this export of gold, India would not have secured the capital goods for the remarkable extension that has taken place in recent years in certain of her industries, such as sugar. The very interesting article on " Price-Curves in the Perspective of Exchange-Curves," written in December 1933, contains useful statistics relating to the main trade staples of India, illustrated by charts, designed to establish the author's thesis that economic recovery had already commenced in India. Perhaps Professor Sarkar will now bring his figures and charts up to date in order that the present position may be estimated.

A. C. C.

14.—*An Essay on Economy and Value*, being an Enquiry into the Real Nature of Economy. By Alec L. Macfie, Lecturer in Political Economy, Glasgow University. London: Macmillan, 1936. × 8¾″ 6.″ xi + 152 pp. *7s. 6d.*

To-day more than at any other time is the question "Whither goest thou?" being addressed to Economics, and in this book Mr. Macfie attempts to answer in terms of philosophy. Starting from Professor Robbins's definition that "economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses," he first emphasizes the fact that not only means but also ends, or our capacities for enjoyment, are "scarce" or limited. "The comparison of satisfactions, and means to acquire them controls the whole cycle of economic life." Taking the demand schedules as given and accepting the principle of equal marginal satisfactions we can isolate a positive science of economics dealing with the application of the scarce means to the given ends, a science, in Professor Pigou's words, "concerned, not with what ought to happen, but with what tends to happen." Mr. Macfie, however, contends that "the economic good of society exists as a practical as well as a logical norm: and that this norm is distinct from, a much wider concept than, the actual demand schedules, or any mere sum of them, on which positive economics is based." Economics is, therefore, normative, dealing with what ought to be as well as with what is or tends to happen. "We are morally obliged to reconcile our selfish economic interests to those of the community."

The next step in the argument is that "economy has also unique value, value in its own right. In this sense it can be described as efficiency, formal perfection, reasonable organization." Economy, or the adapting of means to ends, is an organizing principle, and, therefore, it has value in the sense that values satisfy impulses and are "founded in the actual essence of human nature." Economy as efficiency does in fact satisfy the impulse to self-expression, which is characteristic of human nature. It is a self-conscious process, involving choice, and "economic value" is "just the efficiency with which the maximum satisfaction is attained in the system of choices." The object of economy is the maintenance of the correct balance of choices, the attainment of the golden mean, avoiding both the "too much" and the "too little." It is not confined to production, exchange, and consumption, and Mr. Macfie in most interesting manner sketches the working of the principle in the experience of beauty through art, music, and literature. To sum up: "Economics is fundamentally a normative science, not merely a positive science like chemistry. We fit scarce means to ends, under the persuasiveness of a value, to maximise total satisfactions. We cannot do this without considering the relative satisfactions rendered by particular courses of action, and this very comparison of satisfactions acts on our estimates chemically, biologically, spiritually, so that the choice which finally emerges is unique and quite different from any haphazard collection of possible satisfactions. For it is a selection rationalised by the economic principle as applied by the individual. So economics does not just accept human desires and give them back unchanged. The principle of economy itself transmutes them through its criticism. Thus, while it is for working purposes legitimate, and very useful, to separate out a positive science of pure economics by erecting around it the wall of *ceteris paribus*, we have to conclude that this is just the clearing of the ground. The building that must rise towards the norm is still to be erected." All values form an organic whole and economic value has its place in the system, acting on and being acted on by other values and, in particular, being subject to criticism from the moral values. Social ethics describe an ideal society, descriptive economics supplies the present facts, positive economics provides certain apparatus, and so we can work out the economic changes necessary by applying the most economic use of scarce means possible in the type of society aimed at.

It will be seen that in Mr. Macfie's view Economics is a noble science, concerned with the planned betterment of mankind, not in any way "dismal," and far removed from the analytic development of tendencies to happen from imperfect premises. The economist should be a builder, but not an orator or a politician, and above all he should avoid the error of thinking that economic solutions—currency "reform," tariffs, etc.—"can loosen all our chains." Social evils are not due to inadequate knowledge and organization, but to "their true but more uncomfortable source, original sin." That is, probably, a hard saying for the Southerner and would bear development. Meanwhile we have to thank Mr. Macfie for an interesting and important book. He belongs to the not too numerous band who think for themselves and are not content to thresh over again the grainless straw left by their predecessors. H. W. M.

15.—*Mr. Keynes and the Labour Movement.* By A. L. Rowse. London: Macmillan, 1936. 7½" × 5". x + 68 pp. *2s. 6d.*

When Mr. Keynes published his *General Theory of Employment, Interest, and Money,* he set the cat among the pigeons with a vengeance, and still the noise of battle rolls. Some of his brother economists, not unnaturally reacted violently, others, with not too much adroitness, have tried to persuade him that his heresy is para-orthodoxy, and now comes a Fellow of all Souls to hail him as a crypto-socialist and clothe him in a red shirt. Not that the shirt is *very* red, for Mr. Rowse appears to be on the right wing of what he vaguely calls the Labour Movement and has himself a quite orthodox objection to heretics from his "doxy." "One wonders more and more," he says, "whether the Labour Party does not lose as much as it gains, by the advocacy of the brilliant but extremely individualist men of letters who belong to it, whether they are not liabilities rather than assets. It is obviously time that expression was given to the attitude that is general in the Movement rather than to the especial crotchets of Mr. Shaw, or Mr. Cole, or

Mr. Laski, or Mr. Brailsford, or whoever it may be." Mr. Rowse's main position is that the "Labour Movement" has always been right, at least since 1931, and that Mr. Keynes has constructed a theory of economics (non-Marxian, despite his Marx-like definition of "quantities of employment") which is a complete justification of Labour policy. We cannot here enter into an examination of Mr. Keynes's doctrines, but it will suffice to say that one may agree with many of his criticisms of the classical theory, accept many of his conclusions (and of the contentions of the Labour party), and reject the "London School," without adopting the new theory as a whole.

After greeting Mr. Keynes as the man who has always been right, Mr. Rowse mourns over his avoidance of "capitalist imperialism . . . this most fundamental of questions." "The trouble is," he says, "that Mr. Keynes is a great deal too sanguine. . . . Mr. Keynes trusts too much in the potency of ideas in themselves, in the hope that the right ones will in the long run prevail." On the contrary, says our author, "ideas are only potent because they express and serve certain only too practical interests." "Most people are not open to persuasion, for they have no rational standards. Indeed the sense in which they can be described as rational at all, is a remote one." "What we have to see to is that the interests we support and work for are as near as may be the common interest and that the ideas are right." What a futile conclusion! As if the Victorian industrialists and the Nazi politicians whom Mr. Rowse condemns would not fervently agree! Nor will any of the leaders of the totalitarian states disagree with his characterisation of the common mass of mankind, but it is an odd doctrine in the mouth of the supporter of the "Labour Movement." One had hoped that this spectre of the material basis of history had been laid long ago. Man cannot be carved into self-subsistent divisions. When one speaks of the power of an idea, one does not, as Mr. Rowse seems to do, conceive of it as *bombinans in vacuo*; to become effective it must harness to itself the emotions and then it will transform the interests. This is the history of every religious, of every revolutionary movement. Material basis indeed! "What porridge had John Keats?" H. W. M.

16.—*Other New Publications.**

De Kock (*M. H.*). The Economic Development of South Africa. London: P. S. King, 1936. 8½″ × 5½″. xii + 131 pp. 7*s*. 6*d*.

[After an introduction, giving in a few short paragraphs the history of South Africa from the time of the discovery of the Cape by Bartholomew Diaz in 1548 to the formation of the Dutch East India Company in 1602 and the eventual arrival at the Cape in 1652 of the Assembly of Seventeen under the command of Van Riebeck, the book traces South Africa's development up to the present day: under the Dutch East India Company 1652–1795; from the first British occupation till the Great Trek, 1795–1836; from then till the discovery of precious metals, 1836–70; during the diamond and gold era, 1870–1910; the slackening of progress in the mining industry and great expansion of farming and manufacturing operations in the first two decades of Union; the new economic position created by the prosperity and expansion of the gold-mining industry. It is an interesting and concise account, clearly written, and well fulfils the author's aim "to give the reader the historical background of South Africa's present-day economic conditions and problems." An index is included, also a short list of selected references.]

---

* *See also* "Additions to Library," p. 162.

Lee Chou-Ying. System of Chinese Public Finance. London: P. S. King, 1936. 8½″ × 5½″. 256 pp. 12s.

[Anything which can reasonably be called a system of Chinese finance dates only from the present century. During the monarchical period—that is, from remote ages until 1912—the revenues were entirely at the disposal of the sovereign; and, although fiscal affairs were nominally in charge of a string of impressively named departments (their titles and methods will seem familiar to readers of the *Wallet of Kai Lung*), no public accounts were kept and there was no legislative control. In 1907 reforms were attempted, but the planning was defective and the execution inefficient. In 1912 the new republican Government set up a national financial system, which provided for the preparation of budgets, financial control by the legislature, and the auditing of public accounts by the judiciary. Again, however, the details were badly planned, and when the National Government took control in 1927, the financial arrangements were entirely reorganized. The new Constitution established five governmental "powers" (Yuans), three of which, the Executive, Legislative, and Judicial Yuans, were concerned with finance, the Ministry of Finance being a department under the Executive Yuan. Mr. Lee Chou-Ying, after briefly summarizing the history of financial administration in China, gives, in Part I, a minutely detailed account of the present system, while in Part II he compares each portion of the system with its counterparts in England, the United States, France, and Germany. In both parts of the book the subject is treated under the main heads of Administration, Legislation, Judiciary; in the second part detailed international comparisons are given in each subdivision as it comes, *e.g.*, form and content of the Budget, bases of classification, method of tax-collection, financial Committees—and so on. In his conclusion the author draws attention to defects in the present system and makes suggestions for reform. Appendices contain (A) notes on the current Chinese financial position with various tables, and (B) some specimen budgets, Chinese and others. A bibliography and an ample index follow. As will be gathered, the book is full of specific and carefully compiled information, logically arranged, and should be valuable to students of Chinese affairs.]

Rubinow (I. M.). Some Statistical Aspects of Marriage and Divorce. Pamphlet series No. 3. Philadelphia: American Academy of Political and Social Science, 1936. 9″ × 6¼″. 36 pp.

[The increase in the divorce ratio in the United States which has proceeded for nearly fifty years has been largely interpreted as a sign of the breakdown of marriage, and the decline in the marriage rate which has taken place since 1930 has given support to the assumption. The author of this book has endeavoured to arrive at the true facts by an examination and analysis of the admittedly scanty statistical material available. He has pursued three lines of investigation: (1) the trend of the marriage rate; (2) the trend of the divorce rate; and (3) various relationships between these two trends. The results show that for a period of about forty years ending in 1930 there was an "almost uninterrupted increase in the marriage rate, even if changes in the sex and age distribution are taken into consideration." There was also an increase in the proportion of married persons, particularly in the younger age-group; the drop which occurred after 1929 may be regarded as an effect of the economic depression. There has also been a very rapid increase in the divorce rate, with, again, a fall during the last five years. However, the majority of divorced persons marry again, such marriages amounting to nearly an eighth of all marriages. The author's data are taken from the Marriage and Divorce Reports of the United States Government, and he emphasizes the fact that better statistics of marriage, divorce, and death would throw much light on the problems under consideration; but he also states that the study has been presented largely to show that "much seemingly new information can often be obtained from available statistical sources." His main conclusions were published in two popular articles eight and six years ago respectively, and were much criticized in the absence of the calculations on which they were based. The data and statistical methods are here shown in full, and the investigation has been brought up to date.]

Shields (*Prof. B. F.*). The Labour Contract. London: Burns, Oates, and Washbourne, Ltd., 1936. 7″ × 4½″. 152 pp. 5*s.*

[This little book describes in a brief and simple manner the conditions of Labour in the past and in the present, relating the problems to Christian principles and, specifically, to the Encyclicals on the subject issued by Popes Leo XIII and Pius XI respectively, quotations from which form the headings to the chapters.]

STATISTICAL NOTES.

1. British Official Statistics.

On page 131 we give our usual table summarizing the oversea trade of the United Kingdom for the years 1935 and 1936. The excess of imports over exports of merchandise has shown alternate increases and decreases since the tariff came into operation; in 1933 a decrease of £28 million, in 1934 an increase of £26 million, in 1935 a decrease of £9 million, and last year the large increase of £73 million to £347·8 million. Subsequent to 1933 there has been an all-round expansion of imports, exports and re-exports, and the changes referred to have been due to differential movements, an expansion in imports being followed at a later date by an expansion in exports. Last year imports increased in value by 12 per cent. to £848·9 million and re-exports by 9 per cent. to £60·4 million, the highest figures recorded since 1931. Exports of United Kingdom goods increased by £14·9 million (3 per cent.) to £440·7 million, the highest figure recorded since 1930. Nearly all the increase in exports occurred in the second half of the year, but the expansion in imports and re-exports continued throughout the year.

With the rise in the wholesale prices of commodities, particularly cereals, non-ferrous metals and industrial raw materials, the average values of imports rose appreciably in the latter part of the year—for the fourth quarter the average was about 6 per cent. higher than a year earlier. The rise in average values of manufactured goods exported was much less. For the year as a whole, average values of imports and re-exports rose by 5 and 11 per cent., respectively, while for exports the rise was only 1½ per cent. The increase in the volume of retained imports was 7½ per cent. and of exports of United Kingdom goods 2 per cent., almost precisely reversing the figures for the previous year, viz. 1 and 8 per cent. Over the two years, therefore, exports have expanded slightly more in proportion than retained imports, and this also applies if the comparison is with 1933 instead of 1934.

Following increases of £6·2 million in 1934 and £8·6 million in 1935, retained imports of food, drink and tobacco rose last year by £28·5 million to £371 million. The increase in value was due mainly to price changes, there being an increase of only 3 per cent. in volume, as estimated in the *Board of Trade Journal* for January 28th. All cereals except oats rose in average value, those recorded for wheat, flour and maize being the highest since 1930. For mutton and lamb and bacon the average value was also the highest since 1930. Retained imports of wheat (100·0 million cwts.) were slightly less than in 1935, being smaller than in any year since 1926; for flour, there was an increase of 5 per cent. above the record low figure of the previous year. Imports of barley were the highest since 1924, and there was a record importation of maize. Changes as regards beef and mutton and lamb in the aggregate were small, but there was again a decline in imports of bacon. Changes as regards butter, cheese and tea were also slight; imports of eggs showed a substantial increase, but imports of fresh fruit, except bananas, were lower than in 1935. The quantity of unrefined sugar entered for home consumption last year was the highest ever recorded, as was the total quantity of tobacco retained for home consumption.

Retained imports of raw materials in 1936, valued at £215·2 million, exceeded those in 1935 by £32·1 million. The value was the highest since 1929, while the volume of imports constituted a record, being 13 per cent. higher than in 1935. This confirms the indications of the numbers employed and the index of production that there was greater industrial activity in this country last year than at any previous period in our history. There was a record importation of timber, chemical wood pulp, copra, groundnuts, palm oil, and silk in the aggregate. Retained imports of flax were the highest since 1917, of hemp since 1920, of wool since 1922, and of cotton since 1926. Imports of iron ore exceeded those in any year since 1920. Following the heavy importation of rubber in 1935, re-exports of rubber last year were slightly greater than imports.

The rise in the value of retained imports of articles wholly or mainly manufactured amounted to £26·2 million (15 per cent.), of which about one-third resulted from higher prices. The increase was very largely in goods used as materials for industry. Retained imports of refined petroleum and plywood, and of lead, zinc and nickel exceeded those in any earlier year, while for unwrought copper the imports were larger than in any year except 1935; for tin a decline was recorded. There was a substantial increase in imports of iron and steel, mainly pig-iron and crude steel. Imports of machinery were higher than in any year since 1930, those of machine tools being much larger than in any previous year as a result, in part at any rate. of the re-armament programme. Though imports of motor-cars were less than in 1935, they were larger than in any other year since 1929.

The quantity of coal exported declined further last year by 11 per cent. to 34,533,000 tons, the lowest figure since 1926. Three quarters of the decline of 4,181,000 tons was in exports to Italy, while exports to Spain and Egypt each declined by about 500,000 tons. The value of the coal exported represented only 6·7 per cent. of the total value of British exports, the proportion having fallen year by year from 8·9 per cent. in 1931. Exports of iron and steel declined last year by 5 per cent., following increases in each of the preceding three years, as a result mainly of smaller exports to India. The Board of Trade have calculated that, adding together the value of the exports of iron and steel and manufactures thereof, iron ore and scrap, cutlery, hardware and tools, machinery and vehicles (except rubber tyres), the contribution to the total value of British exports was 24·4 per cent. in 1929, 24·0 per cent. in 1934, 25·2 per cent. in 1935 and 25·4 per cent. last year. Exports of machinery were about the same last year as in 1935; exports of agricultural and electrical machinery continued to increase, but the quantity of textile machinery declined further to the lowest total recorded since the war. The number of motor-cars and chassis exported (88,600) constituted a record for the fourth year in succession, the increase last year being 23 per cent., and for the second year in succession a record number of pedal cycles (519,000) were exported, the increase being 38 per cent. Exports of locomotives and rolling stock and of ships and boats, which had shown some recovery in 1935, improved further last year.

As regards textiles, it is stated in the *Board of Trade Journal* that in 1929 textile exports formed 31·3 per cent. of the total value of British exports, but this proportion has been lower in recent years, being 28·3 per cent. in 1934, 27·5 per cent. in 1935, and 27·6 per cent. in 1936. This decline was due to reduced cotton exports, which formed 18·7 per cent. of the total in 1929, but only 15·1, 14·4 and 14·2 per cent. in 1934, 1935 and 1936, respectively. Exports of wool and manufactures thereof, on the other hand, rose from 8·6 per cent. of the total British exports in 1929 to 8·8 per cent. in 1934 and 9·1 per cent. in each of the past two years. Exports of cotton yarns were the largest since 1929, but cotton piece-goods declined further from 1,948 to 1,917 million square yards, being the lowest for many years apart from 1931 when exports to India were abnormal. There were increased exports to most markets and those to British West Africa constituted a new record. The quantity exported to India, however, fell from 543 to 416 million square yards. Exports of artificial silk piece-goods exceeded those in any earlier year, linen piece-goods were exported in larger quantity than in any year since 1924, and woollen and worsted tissues, wool carpets, and cordage since 1929. Woollen and worsted yarns were lower than in any year since 1931, and jute piece-goods declined compared with 1935;

a large increase was again recorded in exports of jute sacks and bags. The quantity of sheep's and lamb's wool and of wool tops exported was high but failed to reach the exceptional figures recorded for 1935.

Among other goods, exports of nickel constituted a new record. For the past three years there have been increasing exports of pottery, cement, hats, paints and colours, and books, and exports of electrical goods and apparatus have increased in value year by year since 1932. Last year there was also a considerable increase for wool stockings and linoleum. Leather boots and shoes and ammonium sulphate continued to decline. Exports of spirits were higher than in any year since 1916, most of the additional exports going to the United States. Exports of beer also increased, but those of tobacco were less than in 1935.

Imports of bullion and specie rose from £284½ million to £331½ million, while exports declined from £229 million to £105 million. Accordingly imports exceeded exports last year by no less than £226·7, the net absorption of gold being slightly greater. Over half the gold imported came from France, and the exports went mainly to the United States.

There was a marked rise in the level of general *wholesale prices* during 1936, the pronounced upward movement starting from about the middle of the year and continuing fairly steadily until the end. The rise was most noticeable in cereals and in basic materials and primary products, but very few commodities were uninfluenced. Of the 120 commodities the prices of which are given monthly in the *Board of Trade Journal*, only 15 show a decline in December 1936 compared with December 1935 and in nearly all these cases the fall was negligible. The Board of Trade index number (1930 = 100), which in 1934 averaged 88·1 and in 1935 89·0, rose to 94·4 for 1936, an increase of 6·1 per cent. over 1935, and was higher than in any year since 1930. The commodity group showing the largest advance was wool, the prices of which rose 16·8 per cent. Cereals rose 10·6 per cent., non-ferrous metals 7 per cent. and iron and steel 6·1 per cent. The increase in prices in these groups was in general most marked during the last three or four months of 1936, and appears to be likely to continue. Basic materials rose 12·0 per cent. and intermediate products 6·5 per cent. The advance in the prices of primary products is not confined to Great Britain, but appears to be almost world-wide, and in the United States the rise has been considerably steeper than in Great Britain.

Movements and Classes.	Twelve Months ended 31st Dec. 1935.	Twelve Months ended 31st Dec 1936.	Increase (+) or Decrease (−).
Imports, c.i.f.—	£'000.	£'000.	£'000.
Food, drink and tobacco	355,123	382,731	(+) 27,608
Raw materials and articles mainly unmanufactured	212,281	248,171	(+) 35,890
Articles wholly or mainly manufactured	184,519	212,877	(+) 28,358
Other articles	4,118	5,157	(+) 1,039
Total Imports ...	756,041	848,936	(+) 92,893
Exports, f.o.b.—			
United Kingdom produce and manufactures—			
Food, drink and tobacco	31,579	35,587	(+) 4,008
Raw materials and articles mainly unmanufactured	52,836	51,341	(−) 1,495
Articles wholly or mainly manufactured	328,817	340,916	(+) 12,099
Other articles	12,602	12,874	(+) 272
Imported merchandise—			
Food, drink and tobacco	12,556	11,680	(−) 876
Raw materials and articles mainly unmanufactured	29,132	32,962	(+) 3,830
Articles wholly or mainly manufactured	13,336	15,450	(+) 2,114
Other articles	279	325	(+) 46
Total Exports ...	481,137	501,135	(+) 19,998
Bullion and Specie—			
Imports	284,598	331,354	(+) 46,756
Exports	228,922	104,678	(−)124,244

Movements of Shipping in the Foreign Trade—	Number of Vessels.	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.
Entered with cargoes—						
British	24,348	36,110	24,324	38,055	(−) 24	(+)1,945
Foreign	24,580	27,519	26,108	29,340	(+)1,528	(+)1,821
Total entered ...	48,928	63,629	50,432	67,395	(+)1,504	(+)3,766
Cleared with cargoes—						
British	29,306	34,305	29,386	34,305	(+) 80	—
Foreign	21,087	23,020	21,006	22,517	(−) 81	(−) 503
Total cleared ...	50,393	57,325	50,392	56,822	(−) 1	(−) 503

Compared with December 1935, prices in December 1936 showed an advance of 12·1 per cent. in articles of food and 9·4 per cent. in industrial materials and manufactures. Basic materials advanced 17·3 per cent., intermediate products 11·6 per cent. and building materials 5·5 per cent. The rise in the index number for manufactured articles only was just under 4·9 per cent. Taking individual commodities, cocoa advanced in price 80 per cent. during the year, British wheat 55 per cent., rubber 50 per cent., palm oil and lead 46 per cent., British feeding barley 45 per cent., maize 38 per cent., copper 29 per cent.; London flour 28 per cent. and wool 34 per cent. In the space of two years the price of lead has doubled itself, British wheat has advanced 86 per cent., raw wool 70 per cent., copper 62 per cent. and zinc 55 per cent. Basic materials as a whole were in December 1936 over 30 per cent. above the prices in December 1934 and intermediate products 17 per cent.

The Board of Trade index numbers from July 1936 are given below :—

AVERAGES FOR THE YEAR 1930 = 100.

	Total Food.	Total not Food.	All Articles.	Basic Materials.	Intermediate Products.	Manufactured Articles.	Building Materials.
July, 1936	89·9	95·5	93·6	97·4	93·5	98·8	96·9
Aug. „	93·7	96·0	95·2	98·6	93·9	98·9	97·2
Sept. „	95·0	96·6	96·1	99·1	95·0	99·2	97·9
Oct. „	98·0	97·3	97·6	100·5	95·8	99·6	98·5
Nov. „	96·7	99·1	98·3	105·0	97·2	100·4	99·3
Dec. „	99·3	101·6	100·8	110·0	100·4	100·9	100·3
Dec., 1935	*88·6*	*92·9*	*91·5*	*93·8*	*90·0*	*96 2*	*95·1*
Dec., 1934	*86·5*	*88·5*	*87·8*	*84·3*	*85·6*	*94·9*	*92·4*
Year, 1936	*91·7*	*95·7*	*94·4*	*98·9*	*93·3*	*98·2*	*96·7*
„ 1935	*86·8*	*90·1*	*89·0*	*88·3*	*87·6*	*94·9*	*93·8*

The figures for certain of the other British index numbers of wholesale prices and the official index numbers for Germany, France and the United States are given below for comparison, the average prices for 1913 being taken as 100 for all the index numbers except that of the Board of Trade.

Date.	Board of Trade (1930 = 100).	*Economist.*	*Statist.*	*The Times.*	France (*Stat. Générale*).	Germany (*Stat. Reichsamt*).	United States (Bureau of Labor).
Dec., 1935	91·5	98·2	102·0	107·5	354	103·7	115·4
July, 1936	93·6	98·6	102·1	107·6	392	104·2	115·1
Dec., 1936	100·8	109·1	116·0	120·8	499	104 4	119 4

The very considerable rise in the French index number is, of course, due largely to the abandonment of the gold standard in October 1936.

There was a fairly continuous advance in general *retail prices* during 1936 apart from customary seasonal variations, and the Ministry of Labour's index number of prices of articles of working-class consumption showed at January 1, 1937, an increase of about 2·7 per cent. as compared with January 1, 1936. Food prices had increased nearly 4 per cent. during the year and nearly 9 per cent. since January 1935. The principal articles which advanced appreciably in price over the year were, flour, bread, tea, bacon, cheese, and to a less extent potatoes. Flour is now costing nearly 15 per cent. more than at the beginning of 1936 and over 21 per cent. more than at the end of 1934, and bread has naturally risen in price almost as much. Tea has risen during the year 8·5 per cent., bacon 6·6 per cent. and cheese 10·9 per cent. Margarine and the inferior qualities of imported beef and mutton are now the only principal articles of food that are below the prices at July 1914. Milk has increased in price since that date as much as 90 per cent. and fish over 100 per cent. During 1936 the prices of clothing of a kind purchased by the working classes advanced about 4 per cent. and rents moved slightly in an upward direction. The Ministry of Labour index numbers for recent months are given below (prices at July 1914 = 100).

	Aug. 1, 1936.	Sept. 1, 1936.	Oct. 1, 1936.	Oct. 31, 1936.	Dec. 1, 1936.	Jan. 1, 1937.	Jan. 1, 1936.	Jan. 1, 1935.
Food Prices ...	129	131	132	136	136	136	131	125
All Items (food, clothing, rent, fuel, etc.) ...	146	147	148	151	151	151	147	143
All Items (a year earlier) ...	143	143	145	147	147	147	143	142

The index number of the *prices of agricultural produce* in England and Wales, calculated by the Ministry of Agriculture, shows that the recovery in prices which occurred in 1934 and 1935 was continued in 1936, when the index figure showed a rise over the preceding year of 5 points and reached 122 (base 1911–13 = 100). When allowance is made for payments under the Wheat Act, 1932, and the Cattle Industry Act, 1934, the index for 1936 is further increased by 4 points to 126.

The figures for the past six years are given below, the first series showing the General index calculated on prices alone, and the second or revised series including the additional payments referred to above.

	1931.	1932.	1933.	1934.	1935.	1936.
General Index	120	112	107	114	117	122
do Revised	—	114	111	119	123	126

The continued fall in cattle prices was arrested in 1936, and increased prices were also obtained for wheat, barley, fat sheep, fat pigs, potatoes, butter, cheese, eggs, wool and vegetables. Milk prices remained constant, while lower prices were recorded for oats, hay, poultry, fruit and beans.

The Ministry of Agriculture has also published annual index numbers of the prices of feeding stuffs and fertilisers in 1936. Most varieties of feeding stuffs, particularly maize and milling offals, increased in price during the year and the index rose to 93 or 6 points above that of 1935. In the case of fertilisers there was not much change, the index rising by only one point to 89 (base 1911–13 = 100).

Estimates recently issued by the Ministry of Agriculture record a further rise in the *value of the agricultural output* of England and Wales (*Agricultural Statistics*, Part I, 1935). In 1932–33, the minimum year in the recent depression, the aggregate value stood at £184,830,000; in the following year, it improved to £201,750,000, and in 1934–35 to £208,750,000, a total increase in the two years of nearly £24 millions or 13 per cent. These figures, moreover, exclude the payments made to producers under the Wheat Act and the Cattle Industry Act, which in 1934–35 amounted to about £6,400,000 and £1,900,000 respectively. Taking these nto account, the total value of the agricultural output in 1934–35 was appreciably in excess of that recorded in the Census year 1930–31, and nearly up to the level of 1928–29, when it was estimated at £221,370,000.

The changes shown in these figures are a combination of changes in price and changes in quantity. A rough measure of the overall changes in quantity can be obtained by revaluing the output of each description of produce in the various years at the average price ruling in 1930–31, and on this basis the overall increase in the *volume* of the agricultural output since 1930–31 has amounted to approximately 20 per cent. About two-thirds of the increase has taken place in the live-stock and live-stock products group, the remainder being divided equally between farm crops and vegetables.

A Report on *Agricultural Marketing Schemes* for the year 1935, which has been presented to Parliament (Cmd. 5284), shows that there were eight schemes in operation under the Agricultural Marketing Acts, 1931–33, while five other schemes were under consideration. The Report gives without comment all the principal facts and statistics relating to the administration of each scheme. The commodities covered are milk, pigs, bacon, hops and potatoes, four of the eight schemes relating to milk (one in England and three in Scotland).

The scheme of the most general interest is the Milk Marketing Scheme for England and Wales which came into operation in October 1933. The total quantity of milk sold by producers in 1933–34 was 845·3 million gallons and in 1934–35 981 million gallons, an increase of 16 per cent. Of this quantity, 634 million gallons were sold for liquid consumption in the first named year and 665 million gallons in the second, while the quantities sold for manufacturing purposes (*i.e.* butter, cheese, condensed milk, etc.) were 211 million gallons and 316 million gallons respectively, so that the proportions used for these purposes rose from 25 to 32 per cent., the liquid milk consumption not being able to keep pace with the increase in production.

The average regional pool price for the country as a whole was 11·83*d.* per gallon in 1933–34 and 11·99*d.* in 1934–35; this price is, however, subject to deductions for transport charges while there may be additions for premiums. The effect of these adjustments was to reduce the average pool price from 11·99*d.* to 10·28*d.* per gallon.

Under the "milk in schools" scheme, milk is sold to school children at ½*d.* for one-third of a pint, and according to returns collected by the Board of Education at the end of September 1935, the number of children participating was 2,528,000. The total quantity of milk consumed in 1934–35 was approximately 22¾ million gallons.

According to a Report by the Ministry of Agriculture, it appears that there has recently been an improvement in the *wages of agricultural labourers* in England and Wales. In 1931–33, as a consequence of the general agricultural depression, wages declined, and at the lowest point the average minimum rate fell to 30*s.* 6½*d.* per week. In the year ending September 1935, however, the average rose to 31*s.* 10*d.* per week, and subsequently in the period up to March 1936 further increases in the minimum wage brought the average up to 32*s.*, the highest point since the Agricultural Wages Act, 1924, came into operation.

The minimum wage is not synonymous with actual earnings. A considerable proportion of regular workers are employed in tending animals, and work more hours than ordinary workers, while many ordinary workers have opportunities during times of seasonal pressure of earning overtime pay. Experienced workers, moreover, frequently obtain wages well above the minimum rates. No statistics are available to show the extent to which the minimum wage is on the average increased in these ways. The only indication is afforded by some extremely limited data relating to wages actually paid on certain farms visited by Inspectors of the Ministry. These show that in 1934–35, in the case of 2310 ordinary adult male workers the average total weekly earnings were 33*s.* 2*d.*, while in the case of 753 horsemen and 916 stockmen, the total earnings were 36*s.* 10*d.* and 38*s.* 10*d.* respectively. These figures cannot, of course, be regarded as representative, though they give an indication of the comparative earnings of the different classes of workers.

The net effect of all the *Changes in Wages* reported to the Ministry of Labour in 1936 was an increase of £487,050 in the weekly full-time rates of wages of the four millions of workpeople affected.* This is the third year in succession in which a net rise has occurred, net reductions in wages having been recorded for the seven years 1927–33. The principal industries affected by the changes were, coal-mining, transport, engineering, textile, building, iron and steel and other metal trades, but advances took place also in many other trades. Increases obtained amounting to about £3,200 a week were preceded by disputes causing stoppage of work. As regards agricultural labourers the wages of adult males were increased in 36 out of the 47 Wages-Committee areas in England and Wales, and in Scotland wages also advanced. The Ministry estimates that, in all the industries (including agriculture) for which information is available, the average level of weekly full-time rates of wages rose in 1936 about 3 per cent. as compared with 1½ per cent. in 1935

About 133,000 workpeople obtained a reduction in 1936 of their normal hours of labour to the extent of about 2¼ hours per week.

The net number of workpeople involved in *trade disputes* during 1936 was 253,000, some of whom were involved in more than one dispute. In addition about 75,000 employees were thrown out of work at the establishments where the disputes occurred, but were not directly on strike or locked-out. The total number of working days lost in 1936 at establishments where disputes occurred was 1,830,000, compared with 1,955,000 lost in 1935. About 123,000 of the 253,000 workpeople engaged in disputes were in the coal-mining industry and the aggregate duration of these disputes amounted to 852,000 days.

---

* Excluding changes in the wages of agricultural labourers, domestic servants, Government employees, shop assistants and clerks.

Employment improved steadily throughout 1936, and the average rate of unemployment in the insured trades in Great Britain and Northern Ireland (13·2 per cent.) was lower than in any year since 1929, when it was 10·4 per cent. It was lower in 1927 (9·7 per cent.) than in any year since 1920.

At the end of the year the rate had fallen to 12·2 per cent. compared with 14·1 per cent. in December 1935 and 11·0 per cent. in December 1929. Over the period 1920–36 the highest percentages unemployed were in August 1932 and January 1933 (23·0 per cent.) and the lowest point reached since 1920 was in May 1927, when the rate was 8·7 per cent. In all districts employment in 1936 was better than in any year since 1930 and, except in Wales and Scotland, was also better than in 1930. Unemployment during the year was lowest in the London and South Eastern Districts (7·2 and 7·3 per cent.) and highest in Wales (29·4 per cent.). In the Midlands the percentage was 9·2 per cent., and in the South-Western District 9·4 per cent. In the North-Eastern and North-Western Districts and in Scotland the rates were 16·8, 17·1, and 18·7 per cent., respectively, while in Northern Ireland the rate was as high as 22·7 per cent.

In 96 out of the 102 groups in which the Ministry of Labour divides up the insured trades employment was better in December 1936 than in December 1935, and in the remaining 6 industries, covering about 265,000 persons, the numbers unemployed had risen only by 1 per cent. of those in the trades. There were, however, rather over a million persons in industries where the rate of unemployment exceeded 20 per cent. In public works contracting it was as high as 44·4 per cent., in dock labour 30·0 per cent., in shipbuilding 26·9 per cent., and in shipping 24·7 per cent. Unemployment was lowest among makers of scientific apparatus (2·9 per cent.), in electrical engineering (3·3 per cent.), in the tobacco, cigar and cigarette industry (3·5 per cent.), in commerce, banking, etc. (3·9 per cent.), in the construction and repair of vehicles of all kinds (4·5 per cent.), in paper, etc. trades (4 to 5 per cent.), and in tramway and omnibus service (4·3 per cent.).

The industries showing the greatest improvement during 1936 were shipbuilding, the iron and steel, engineering and metal trades generally, pottery, and to a somewhat less extent cotton-spinning and manufacture. Nearly all these trades had shown appreciable improvement also in 1935. There has been a decline in employment in the artificial silk-yarn industry.

The average number of insured persons,* aged 16–64, employed in Great Britain during 1936 was 10,896,000 and since March 1936 "the figures for each month have been higher than for any earlier date during the sixteen years for which comparable statistics are available." The number employed at December 14, 1936 (11,132,000), was over 500,000 higher than at December 16, 1935.

The number of workpeople (insured and uninsured) on the registers of the employment offices of the Ministry of Labour in Great Britain are given for July to December 1936 in the following table :—

Date.		Wholly Unemployed.	Temporarily Stopped.	Persons Normally in Casual Employment	Total.
July 20, 1936	..	1,285,805	296,007	70,260	1,652,072
Aug. 24, ,,	..	1,297,596	244,874	71,470	1,613,940
Sept. 21, ,,	...	1,322,934	232,122	69,283	1,624,339
Oct. 26, ,,	...	1,345,789	193,429	72,592	1,611,810
Nov. 23, ,,	..	1,367,492	188,643	67,467	1,623,602
Dec. 14, ,,	..	1,365,035	194,841	68,843	1,628,719
Dec. 16, 1935	...	1,385,990	205,574	77,001	1,868,565
,, 17, 1934	..	1,717,005	288,257	80,553	2,085,815
,, 18, 1933	..	1,830,977	308,821	84,281	2,224,079
,, 19, 1932	...	2,171,175	454,522	97,590	2,723,287 *

* Highest figures in any December.

The above figures for 1936 include juveniles aged 14 and 15 and agricultural workers who became insurable on May 4, 1936. The number of juveniles aged 14 to 15 was 14,364 and of agricultural claimants to benefit 13,653 at December 14, 1936.

An interesting article in the *Ministry of Labour Gazette* for January 1937 deals with statistics relating to the *duration of unemployment* experienced by applicants for benefit during the last five years. Statistics of men and women claimants are analysed separately, and it is clear that the problem of long-period unemployment is principally concerned with men, for whereas at December 1936 less than 10 per cent. of the unemployed women had been out of work for twelve months or more, no less than 25 per cent. of the men were in that condition. Moreover, the proportion of men suffering lengthened unemployment had increased considerably over the 5 years. In 1932 the mean percentage was 17 per cent. of all men unemployed, while in 1936 it was 25 per cent. Among women the proportion had actually decreased slightly (from 9·4 to 8·9 per cent.). It is not made clear why the record of the sexes should differ so much, but it may be due to a greater capacity in women to maintain their industrial efficiency longer, and thus increase their chances of re-employment after prolonged spells of inactivity. On the other hand, it may be that women so situated have greater difficulty in proving normal insurability, and in qualifying for prolonged benefit. A further analysis, from such figures as are available, shows that in 1935 and 1936 the numbers of men and women together who had been out of work for more than five years had increased from 31,446 at June 1935 to 60,742 at December 1936, *i.e.* the figure had almost doubled in 18 months, and the proportion had increased from 1·8 per cent. to 4·4 per cent. of the unemployed. With these figures it is easily understandable why the Chief Commissioner for the Distressed Areas recommended that consideration should be given to the question of the removal from the registers of employment exchanges of those who have been out of work over five years. Hardly any of these people can be effective applicants in the labour market.

---

* Excluding agricultural workers.

Over the years 1929 to 1936 the yearly number of separate individuals with claims varied from 3,900,000 in 1929 to 5,900,000 in 1932 and 6,050,000 in 1931. The average number of claims current on any one day varied from 27·2 per cent. of the total claims in the year in 1927 to 42·1 per cent. in 1933, 41·6 per cent. in 1932, and 40·4 per cent. in 1931. In 1936 the total number of claims was 4,180,000 and the average daily number 1,487,700 or 35·6 per cent.

The Ministry of Transport Return of Railway Statistics No. 203 contains the revenue statistics for the month of October 1936 and operating results for the four weeks ended October 31st with aggregate figures from the commencement of the year. Gross revenue shows a substantial improvement, passenger traffic for the ten months having produced £47,397,000 (exclusive of season tickets), or 4·4 per cent. above the corresponding total in 1935, whilst freight receipts were £75,449,000, an increase of 4·8 per cent. Passenger journeys for the same period totalled 1,075,308,000, or 3·2 per cent. above the 1935 figure, including 338,817,000 journeys over the lines of the London Passenger Transport Board. The general industrial improvement is reflected by an increase of over 13,000,000 in the number of workmen's journeys, and has produced an increase of 3·5 per cent. in freight tonnage, which for the 44 weeks amounted to 235,947,000. Receipts per passenger journey were 10·58*d.*, compared with 10·45*d.* in 1935, or 13·96*d.* and 13·89*d.* respectively if the London Passenger Transport Board's undertakings are excluded. The average receipts per ton of freight were 6*s.* 5*d.*, or slightly higher than in 1935. The average length of haul of freight traffic rose from 56·2 to 58·0 miles.

The improved traffics have necessarily led to increased operating expenditure. Coaching engine miles were 1·9 per cent. higher at 293,039,000 and freight engine mileage rose by 4·6 per cent. to 214,699,000. Heavier freight trains are indicated by an advance of 9·1 per cent. in the mileage run by assisting engines and difficulties in balancing the working or allocating return loads are suggested by higher figures of light engine mileage. The costly nature of freight traffic working is illustrated by the high proportion of engine power not directly used in train working. For every 100 freight train miles approximately 89 miles have to be covered by shunting, assisting and light engines, whilst in the case of coaching mileage the " unremunerative " proportion is rather less than 11·0 per cent. The average net load of freight trains is 1·74 tons higher at 126·16 tons, but the rate of movement, 9·05 train-miles per train-hour, is slightly below the 1935 average, and the reduced speed has brought down the ton mileage per engine-hour (a figure often regarded as the index of freight operating efficiency) from 462·6 to 461·4.

The return also gives details of the tonnage dealt with and cost of working at 117 selected goods depots, but variations in the nature of the traffics handled preclude comparisons. There is, however, a slight increase over the previous year in the average weight per consignment, this having risen by 0·01 to 3·36 cwts. In addition, an interesting comparison is given between the average cost of conveying goods traffic by horse-drawn and mechanically propelled vehicles during September/October. The difference of approximately 2*d.* per ton in favour of the motor vehicle is surprisingly low.

The gross traffic receipts published by the companies for the 52 weeks ended December 27, 1936, are as follows :—

	Receipts	Increase on 1935	
	£	£	%
Great Western	26,176,000	754,000	3·0
L.M.S.	63,379,000	2,512,000	4·1
L.N.E.	45,963,000	1,327,000	3·0
Southern	20,816,000	463,000	2·3
Total	156,334,000	5,056,000	3·3
London Transport Railways (26 weeks)	14,607,000	460,000	3·3

2. Other Statistics.

The value of Stock Exchange Securities as measured by the index number published in the *Bankers' Magazine* registered at December 16, 1936, an advance of 5·3 per cent. as compared with December 20, 1935. The rise was almost entirely in the value of the Variable

Dividend Securities, which had increased nearly 14·7 per cent., the prices of Fixed Interest Stocks increasing only 1·1 per cent. Prices of the former are now at a higher average level than at any time since 1930. Some advance was registered in almost all categories, but the most noticeable was in the price of Foreign Railway Shares (principally Argentine), which increased over 70 per cent. There were also considerable advances both in British Railway Ordinary Stocks (37·2 per cent.) and in United States Railway Shares (33·8 per cent.). Iron, coal and steel shares moved upward 41·1 per cent. and shipping shares 18·1 per cent., a result due principally to the marked improvement in freights during the last three months of 1936. On the more speculative markets copper shares rose 58·2 per cent., rubber shares 57·8 per cent. and oil shares 45·3 per cent. Among Fixed Interest Securities the principal advance was in British Railway Preference Stocks, which rose rather more than 17 per cent. over the twelve months. The net movement in British Government Funds was slight, and prices were not quite as high as in 1935. United States Bonds had advanced by 6·4 per cent. at the end of the year.

There was a notable increase in the rates for *shipping freights* in the last four months of 1936, and the index number (1920 = 100) of the Chamber of Shipping for the year showed an advance of 19 per cent. over the number for 1935 (22·58 compared with 18·97). The index number for December 1936 (31·71) was 21·6 per cent. in advance of that for November 1936, and as much as 41 per cent. higher than in December 1936. During the latter half of 1936 rates were in excess of the minimum schedule rates on most inward voyages, and in the last three months of the year very appreciably so. Outward rates had not increased to the same extent, but some general improvement took place towards the end of the year. Under the subsidy scheme (£2,000,000) for tramp shipping a reduction of one-eighth is made if the average level of freights for the year should rise to 93 per cent. of the level of 1929, and similar reductions would take place if the percentage rose higher. In 1936 the average level was rather less than 91 per cent. of that for 1929, but for the last four months of 1936 the percentages were 97·6, 104·2, 104·8 and 127·5, and the Government announced in November 1936 that a continuance of the subsidy after 1937 was not to be expected.

According to the statistics * prepared by the Bank of England in conjunction with the Association of Retail Distributors the money value of *retail sales* over the ten months February to November 1936 showed an increase of 6·3 per cent. as compared with the corresponding months in 1935. Sales of food and perishables increased 8·0 per cent. and the sales of other merchandise 4·6 per cent. It may be noticed that the Ministry of Labour index number of articles of food of working-class consumption showed an increase of 4·6 per cent. over the same 10 months. Taking the average daily sales in 1933 as equalling 100, the index number for the 10 months February to November 1936 was 112·8, and in the corresponding periods of 1935 and 1934 106·0 and 100·4 respectively. Daily sales are consistently lower in February and August of any year and higher in November, December and January. In November 1936 the index number stood at 123, or higher than November in any of the years 1932–35.

---

* Based on monthly returns from Department Stores, Co-operative Societies Multiple Shops and independent retailers.

In the Irish Free State *employment* improved considerably, and was better than in 1934 or 1935.

Employment in Germany showed marked improvement during 1936, the number of registered unemployed declining from 2,508,000 at the end of December 1935 to 1,478,000 at the end of 1936, a fall of over a million. Of the 1,478,000 out of work at the end of 1936, 896,000 were on unemployment benefit and 165,000 on public assistance. The number registered as unemployed may possibly exclude those on voluntary labour service and relief works, but in any case the reduction in unemployment has been considerable and follows on an appreciable reduction in 1935. In France employment improved from February 1936 onwards, and the returns of the official monthly enquiry showed an improvement month by month compared with the corresponding period in 1935. This was the first year since 1931, when the enquiry was started, that improvement over the previous year has been indicated. Employment improved somewhat in Belgium during most of 1936, but was dull generally. In Czechoslovakia it was better on the whole, but in Austria it was not quite so good, and in Poland there was some falling in the autumn compared with 1935. In the Scandinavian countries employment was better than in 1935, but the percentage unemployed in trade unions remained considerable. Employment continued to improve in the United States, and is now better than at any time for some years. The index number of employment based on returns covering over one-half of the aggregate number employed in manufacturing industries was in October 1936 as high as 92·1 (1923–5 = 100), compared with 85·3 in October 1935 and 78·4 in October 1934. The number of applicants on the registers of the public employment exchanges fell to 6,832,000 at the end of November 1936. At November 1935 it was 9,197,000. Both these figures, however, include persons provided with employment on public relief-work schemes. In Canada employment improved through the year. In New Zealand and Australia there was also a noticeable improvement, which was rather more marked in Australia.

The October Crop Bulletin of the International Institute of Agriculture states that according to current estimates the *world's wheat crop* appears likely to be insufficient to cover requirements for consumption. This is the fourth year in succession that this has happened, the deficit being met by drawing on stocks carried over from preceding seasons.

The supplies of wheat which are likely to be available in 1936–37 from the principal *exporting* countries, after providing for their home requirements are estimated at 676 million bushels, the lowest figure recorded for many years; this figure is made up of 250 million bushels carried over from old crop stocks and only 426 million surplus from the new crop of 1936. The quantities necessary to cover the requirements of *importing* countries in 1936–37 according to the information and estimates at present available amount to 420 million bushels for Europe and 125 million for non-European countries, making a total of 545 million bushels or somewhat more than in the past two years.

It will be seen from this that the total exportable surplus (676 m. bush.) is more than sufficient to meet requirements (545 m. bush.), but that after these requirements have been satisfied, the balance of exportable stocks, *i.e.* the carry-over, remaining at the end of the season (August 1, 1937) will be reduced to 125 million bushels as compared with 250 million at the same date last year. The quantities carried over from one season to another have been steadily diminishing since August 1933, when they attained the record level of 625 million, and the balance likely to remain at the end of this season is below the normal level prior to the great depression in wheat prices. It is, however, to be noted that this reduction has not been brought about by development in demand, but has been the result of a four-year succession of poor crops in North America. If in only one of these four years the North American crop had been up to the previous average, the probable stocks on August 1, 1937, would not be much below the record level of 1933. Whilst, therefore, the heavy load of unsold stocks that has for several years depressed the international wheat market has been entirely absorbed, the situation as regards supply and demand has not permanently altered.

CURRENT NOTES.

We welcome the appearance of Volume I of Statistical Research Memoirs, a new series to be published by the Department of Statistics at University College, London.

In a foreword the editors, J. Neyman and E. S. Pearson, mention that the memoirs are being published in continuation of a tradition established in 1904 with the issue of the first Drapers' Company Research Memoir. The reorganization, on his retirement, of the laboratories of which Karl Pearson had been the Head, into a Department of Eugenics and a Statistical Department has led to a greater degree of specialization in the latter, and the editors think that the efforts of workers in the Department of Statistics will be more fruitful if papers on the subject are published mainly in one place, rather than spread over a number of journals devoted either purely to mathematical subjects or to what may be termed general statistics. The Statistical Research Memoirs will contain only papers prepared in the Department of Statistics, and it is hoped that a volume of over 150 pages will be issued once a year.

The first volume contains the following papers :—

"Contributions to the Theory of Testing Statistical Hypotheses." By J. Neyman and E. S. Pearson.

"An Investigation into the Application of Neyman and Pearson's L_1 Test, with Tables of Percentage Limits." By P. P. N. Nayer.

"Note on the Extension of the L_1 Test." By B. L. Welch.

"Tests of Certain Linear Hypotheses and their Application to Some Educational Problems." By Palmer O. Johnson and J. Neyman.

"On the Analysis of k Samples from Exponential Populations with Especial Reference to the Problem of Random Intervals." By P. V. Sukhatme.

"Sufficient Statistics and Uniformly Most Powerful Tests of Statistical Hypotheses." By J. Neyman and E. S. Pearson.

"Tests of Statistical Hypotheses in the Case when the Set of Alternatives is Discontinuous, illustrated on Some Genetical Problems." By Robert W. B. Jackson.

Middle-aged students of industrial combinations will remember the publication in 1906 of an important work on that subject by D. H. Macgregor, afterwards Drummond Professor of Political

Economy at the University of Oxford. It has been for some time out of print, and we are indebted to the London School of Economics and Political Science for securing its re-issue as the first of a series of reprints of scarce works on political economy (*Industrial Combination*, London: Bell, 1936, pp. ix + 245). Even after thirty years it will well repay perusal, for it differs from the usual books confined to description or denunciation and is a dispassionate study of the economic aspects of the movement. The book is in three parts; the first is a deductive study of the chief elements of competing strength in relation to combination; in the second the conditions favourable to combination are considered more inductively; the third part deals with the national effects of combination and with national policy and the movement. The passage of time has not robbed this book of the merit of being one of the outstanding works on its subject. In his original preface the author said: "Whether, or how long, or with what modifications in structure, trusts and cartells will endure in the twentieth century is, in my view, impossible of prophecy." The post-war period surely provides him with some materials for an answer. The public attitude towards combinations has altered; the British Government sometimes fosters amalgamations of interests and sometimes influences prices in various directions; everyone has in mind the possibility of developing the controlled public utility company as the next advance in the evolution of industrial enterprise. The foundational problem is how to fix a price which will call forth the greatest possible number of consumers and at the same time afford a "fair" profit to the producer, and at present the provisional answer appears to be that a "fair" profit is one that enables the receiver to maintain the current standard of life of the class to which he belongs —an easy answer which breaks down when we reflect that in any group of producers there may be several social classes. There is abundance of work for Professor Macgregor to tackle, and it is to be hoped that he will soon give us a sequel to his original book.

Mr. R. E. Seyd, a Fellow of this Society, has issued his annual summary of the statistics relating to *bankruptcies, deeds of arrangement, and companies wound up* in the United Kingdom and Irish Free State. The total number of failures in 1936 was 5,647, a smaller figure than in any of the preceding 11 years; these included 104 in the Irish Free State. The financial, wholesale, and manufacturing classes furnished 417 cases, the professional classes, etc., 455, and the retail trades and working classes 4,775. In the wholesale trades there were 102 failures among manufacturers and merchants of woollens, silks, etc. (including cotton), while the mortality in the retail trades was greatest among builders (567), grocers and provision dealers (422), farmers (295), drapers and hosiers (285), and plumbers, painters, and gasfitters (253). In 1936 1719 limited companies were wound up voluntarily, 1184 on account of liabilities (525 in wholesale, etc., trades, 34 among the professional classes, and 625 in retail trades).

Another collection of statistics of *new issues* is being made, for the *Daily Herald*, by Mr. Douglas Jay, a Fellow of this Society. These show the methods by which the capital was raised (public issues, introductions, offers to shareholders, etc.), nature of the issues, amounts subscribed, amounts allotted to vendors, the assets transferred by vendors and the consideration received, the distribution of publicly raised money, and the geographical distribution of the issues. The circular for January 1937, contains a digest of the figures under those particulars for that month and for the year 1936.

It has been suggested that some persons have been misled by the footnote on p. 545 of Part III of the *Journal* for 1936 into thinking that the Department of Political Economy at University College came to an end after the retirement of Professor Foxwell. This is very far from being the case, and in justice to the staff and students some particulars of the present organisation are subjoined: Foxwell retired in October 1927 (not in 1928 as stated) and was made Emeritus Professor in that year. Mr. N. F. Hall, who had been appointed to the Staff of the Department in July 1926, but had been on leave of absence during the session 1926–27 completing the tenure of a travelling Fellowship in America, remained in charge of the Department and succeeded to the Chair in 1935. There are now in the Department about 250 students, of whom 110 are working for degrees, the remainder taking Economics as part of their Degree courses in the Faculty of Arts or for University Diplomas. In addition to Professor Hall there are two Lecturers in Economics. Mr. H. T. N. Gaitskell, B.A., and Mr. H. Barger, B.A. (who is at present working on monetary problems at the National Bureau of Economic Research as an Honorary Fellow); Dr. P. N. Rosenstein-Rodan, D.rer.Pol., B.Com., is a special Lecturer in the History of Economic Thought; Dr. Doreen Warriner, B.A., Ph.D., is an Assistant Lecturer, and Dr. T. Balogh, D.rer.Pol., an Honorary Lecturer. With regard to special research work, Professor Hall and Mr. Frank Muirhead are examining the effects of changes in the structure of the internal debt of the British Government upon monetary policy in the post-war period. Students under the direction of Dr. Rosenstein are working on special problems of monetary theory and the theory of public finance in England at the end of the seventeenth and the beginning of the eighteenth centuries, on the economic theories of Cairnes, and on the economic writings of Bentham Dr. Rosenstein and Mr. Gaitskell are also conducting a special post-graduate seminar on advanced capital theory with special reference to the trade cycle. Mr. A. T. K. Grant, B.A., with a special grant from the Leverhulme Trustees, is investigating the supply of industrial capital in the United Kingdom since the War, and Mrs. Nancy M. Windett, B.Sc.(Econ.), has just completed an examination of the industrial and commercial development of Canada in the post-war period for which she made investigations in the Dominion. Finally, the University of London has recently conferred the degree of Ph.D. on Mr. W. F. Darke for a study of the economic problems of the small-holding movement, which he made as holder of a scholarship from the Agricultural Research Council under the direction of Dr. Warriner. This is a worthy record of activity.

The Agricultural Economics Society announces that the first prize, of £10, offered by the Society in its Essay Competition for 1935–36 has been withheld. The second prize, of £5, has been awarded to Mr. W. F. Seark, B.Sc. (Econ.), 10, Fladgate Road, Leytonstone, E.11, for an essay on "Trends of Production in British Agriculture."

The Cowles Commission for Research in Economics, which maintains a statistical laboratory in Colorado Springs, has recently established two Research Fellowships of $1,000 a year each. These will be awarded to promising young men, with the doctor's degree or equivalent experience, who have demonstrated ability to do constructive research in the field of economics and statistics. The purpose of the Fellowships is not so much to give the formal theoretical training which is best obtained at a large university, as to supply a familiarity with the problems which arise in connection with actual statistical investigations. The Research Fellows are expected to acquire practical familiarity with various types of computing machinery and technique, and in other ways to fit themselves for the supervision of extensive research projects.

For the year 1936–37 Cowles Commission Research Fellowships have been awarded to Herbert E. Jones and Gerhard Tintner.

The Commission was established in 1932 as a not-for-profit corporation to conduct investigations into problems of current economic interest, with particular reference to the application of statistics and mathematics in the solution of these problems. It has been engaged for some time in the preparation of new monthly indexes of common stock prices, beginning in 1872 and continuing until 1918 or 1926, when comparable Standard Statistics indexes become available.

The Commission in 1935 and 1936 conducted Research Conferences in Economics and Statistics. At the 1936 Conference the speakers included Professors Irving Fisher, R. A. Fisher, Corrado Gini, and Drs. A. J. Lotka, W. A. Shewhart, and Carl Snyder.

Plans are now being made for the 1937 Conference which will be held at Colorado Springs, June 28 to July 23, 1937. All who are working in the field of economics and statistics, including college teachers, research workers, and graduate students, will be welcome. Those interested may obtain further particulars by addressing the Cowles Commission, 301 Mining Exchange Building, Colorado Springs, Colorado.

We are asked to announce that a Congrès International des Sciences Économiques et Sociales will be held in Paris in the month of July 1937. These meetings of French-speaking economists have been regularly held in Paris since 1924, and since 1933 their proceedings have been published in a volume entitled *Travaux du Congrès des Économistes de Langue Française.* The President this year will be Professor Henri Truchy, and the Secretary is Professor Jean Lescure.

OBITUARY.

HARALD WESTERGAARD, 1853–1937.

BY the death of Professor Harald Westergaard at the age of 84, Europe has lost her senior statistician. The book by which his reputation outside Denmark was made, *Die Lehre von der Mortalität und Morbidität*, was published in 1881 (revised edition in 1901); it is possible to learn under what influences it was written by reading the chapter on Vital Statistics, in his *Contributions to the History of Statistics*, 1932. *Die Lehre* was already the standard book on its subject, when the present generation of statisticians began their education. Prior to this work Westergaard was employed in the Danish Insurance office; the essay on which it was founded was awarded the gold medal of the University of Copenhagen, and led to his appointment as Lecturer in 1883 and as Professor in 1886, at the age of 33. He occupied the chair for 41 years; his tenure was interrupted by a premature retirement, and on his resumption he had the unusual experience of lecturing in front of his own marble bust, which commemorated his earlier tenure. His eightieth birthday, which found him in full intellectual vigour, was commemorated by a collection of essays in his honour by Danish statisticians. His appearance the following year in London at the Twenty-second Session of the International Institute of Statistics was greeted with a great ovation.

Westergaard was not a very prolific writer. Besides the two books already named we have his *Grundzüge der Theorie der Statistik*, 1890, revised with the co-operation of Professor Nybølle in 1928, and *The Economic Development of Denmark*, 1922 (Carnegie Endowment). His main interest was in vital statistics, and he gave two lectures on this subject at University College in 1925, published in *Biometrika* and *Economica* in that year. There are also articles in Danish periodicals. But throughout his life he was occupied in the study and amelioration of social conditions, and wrote on unemployment, savings, planned economy and other subjects.

Except in his special province his contributions to the theory of statistics were not marked by originality, but rather by critical appraisement of the importance of new developments. He deprecated the use of mathematics when arithmetical processes showed the essentials, and in his hands arithmetic was a very powerful tool. His point of view is best seen in his paper, "The Scope and Method of Statistics," *American Statistical Association Journal*,

1916. No student of method can afford to neglect his *Contributions to the History of Statistics*, reviewed in the *Journal of the Royal Statistical Society*, 1932, pp. 720. He was nominated Honorary Fellow of our Society in 1907. He was a Fellow of the Royal Economic Society from 1893, and for many years its Danish Correspondent. Elected a member of the International Statistical Institute in 1902, he became an Honorary Member in 1929; but, except at the Copenhagen Session in 1907, he did not take any prominent part in its work.

This is not the place to write at length of his personal charm, marked by simplicity, helpfulness and friendliness; but it was this as much as his intellectual eminence that gave him a unique place in the society of economists and of statisticians.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Agricultural Economics Society, Journal of, November, 1936—Report of the Conference held at Wadham College, Oxford, 3rd to 6th July, 1936 . . . (whole number).

Annals of Eugenics—

September, 1936—Tests of significance applied to Haldane's data on partial sex linkage: *R. A. Fisher.* The standard deviation of a difference: *L. McMullen.* An analysis of the records of the physique of school children in a third borough (Willesden), compared with those of two boroughs previously examined, and of some differences of physique within the borough: *M. N. Karn.*

November, 1936—Changes in the mean values of characters in mixed populations: *V. V. Bunak.* The χ^2 distribution for the binomial and Poisson series, with small expectations: *W. G. Cochran.* Post-natal development of hair and eye colour, with special references to some ethnological problems: *M. A. MacConaill.* Comparison of the mean physique in the schools of three suburban boroughs, and of the variance of physique within the schools: *M. N. Karn.*

Auctioneers' and Estate Agents' Institute of the United Kingdom, Journal, January, 1937—Estate planning in relation to town planning: *Thomas Adams.*

Bankers' Magazine—

October, 1936—Taxes, rates and "social services": *E. T. Good.*

November, 1936—Devaluing the franc. The international currency game: *A. H. Gibson.*

Biometrika, December, 1936—Karl Pearson. An appreciation of some aspects of his life and work: *E. S. Pearson.* Moments of the ratio of the mean deviation to the standard deviation for normal samples: *R. C. Geary,* with a note on probability levels for $\sqrt{b_1}$, by *E. S. Pearson.* The efficiency of statistical tools and a criterion for the rejection of outlying observations: *E. S. Pearson* and *C. Chandra Sekar.* The standard error of Gini's mean difference: *U. S. Nair.*

Chartered Surveyors' Institution, Journal, November, 1936—Management and maintenance of corporation housing estates: *W. Pritchard.*

UNITED KINGDOM—*Contd.*

Economica—

August, 1936—The co-ordination of the general theories of money and price: *P. N. Rosenstein-Rodan.* India's economic position and policy in relation to the new constitution: *Vera Anstey.* The symmetry between import and export taxes: *A. P. Lerner.*

November, 1936—An analysis of unemployment, I: *Sir William Beveridge.* Taxation of savings: *D. H. Macgregor.* Banking policy and the balance of international payments: *F. W. Paish.* The breakdown of the boom: a possible mechanism: *G. L. S, Shackle.*

Economic Journal, September, 1936—New light on Adam Smith: *Prof. W. R. Scott.* The supply of gold: *J. M. Keynes.* Irrationality in consumers' demand: *W. R. Reddaway.* Japanese competition and international trade theory: *N. Skene Smith.* Cotton-indices: *M. J. Elsas* and *Barnard Ellinger.* Family means and personal responsibility: *P. Ford.* Fluctuations in net investment in the United States: *J. M. Keynes.*

Eugenics Review, October, 1936—Is national intelligence declining? *Raymond B. Cattell.* Future of our population: *C. P. Blacker.* Eugenics and the decline in population: *D. Caradog Jones.*

Institute of Actuaries, Journal—

Part II, 1936—Dr. Gottfried Schaertlin Prize essays on the official universal notation adopted by the Second International Actuarial Congress, 1898.

Part III, 1936—Binary calculation: *E. William Phillips.* Notes on foreign actuarial journals: *W. Palin Elderton.*

Institute of Bankers, Journal—

November, 1936—The financing of agriculture: *D. R. McMaster.*

December, 1936—Devaluation—its use and abuse: *Raymond Burrows.*

Midland Bank Monthly Review, December, 1936–*January*, 1937—Monetary policy in Northern Europe, I—Experience in Sweden and Finland.

Population, November, 1936—Differential fertility in Copenhagen: *Søren Hansen.* The trend of the illegitimate birth-rate in the United States: *S. J. Holmes* and *E. R. Dempster.* Science of population: *G. H. L. F. Pitt-Rivers.* Regional planning in relation to population movement: *G. H. L. F. Pitt-Rivers.* Population administration and the family-individual-card system in the Netherlands: *H. W. Methorst* and *J. L. Lentz.* The quantitative problem of population: *Dr. Charles Balás.* Statistics of Jewish marriages in England and Wales: *M. Kantorowitsch.*

UNITED KINGDOM—*Contd.*

Public Administration, October, 1936—Where stands public administration? *Sir Gwilym Gibbon.* Where stands public administration? Blue prints *versus* red tape: *E. M. H. Lloyd.* A survey of Soviet finance: *Margaret S. Miller.* The state in relation to banking: *C. R. McKerihan.*

Royal Philosophical Society of Glasgow, Proceedings, Vol. LXII— —Geography in India's history: *Rt. Hon. Lord Meston.* The problem of the adult mental defective: *Dr. Charles G. A. Chislett.*

Royal Sanitary Institute, Journal, January, 1937—Atmospheric pollution—the present position: *C. M. Opie.*

Statistical and Social Inquiry Society of Ireland, Journal, Session 1935–36—Bargaining power as an economic force: *Lt.-Col. K. E. Edgeworth.* The future population of Saorstát Eireann and some observations on population statistics: *R. C. Geary.* The forthcoming census of population: *Stanley Lyon.* Irish Free State railway accounts: *John Mackie.* Cinema statistics in Saorstát Eireann: *T. J. Beere.*

INDIA—

Indian Journal of Economics, October, 1936—The optimum in recent population theories: *Dhurjati Prasad Mukerji.* The nationalization of money: *Basavarsu Ramchandra Rau.* Factory sugar and its problems: *R. D. Tewari.*

Sankhyā, Indian Journal of Statistics, Part III, 1936—Cancer in India, Persia, and Ceylon: *Frederick L. Hoffman.* A note on "Cancer in India, Persia, and Ceylon": *K. C. K. Raja.* A new theory of ancient Indian Chronology: *P. C. Mahalanobis.*

UNION OF SOUTH AFRICA—

South African Journal of Economics—

September, 1936—A survey of the financial administration of the Union, 1920–35: *H. A. Shannon.* Economics in South Africa: *Prof. R. Leslie.* Professor A. G. B. Fisher on the clash of progress and security: *Prof. S. Herbert Frankel.*

December, 1936—Some notes on the theoretical aspects of import quotas: *J. N. Reedman.* Commercial air transport, III: *E. D. Weiss.* The "new despotism" in agriculture: some reflections on the marketing bill: *C. S. Richards.*

UNITED STATES—

Actuarial Society of America, Transactions, Vol. 37, Part I— Actuarial note. Extension of American men table to age zero: *Walter G. Bowerman.* Mortality experience and other aspects of insurance for larger amounts: *Edward W. Marshall.* Report of Joint Committee on Mortality—mortality under issues of 1925–34.

UNITED STATES—*Contd.*

American Academy of Political and Social Science, Annals—

September, 1936—Railroads and government. Showing the status of the railroads and their services in the United States and four other countries, with emphasis on the question of government ownership (whole number).

November, 1936—The American people: studies in population (whole number).

American Economic Review—

September, 1936—Issues in the economics of stationary States: *Frank H. Knight.* Reserve money and the 100 per cent. proposal: *Frank D. Graham.* Theory of the shortened working week: *T. N. Carver.* Probable incidence of social security taxes: *Russell Bauder.* Mr. Snyder on capital supply and national well-being: *B. S. Keirstead*, with a reply by *Carl Snyder.*

December, 1936—Monopolistic and imperfect competition: *Horace G. White.* Silver clause in China: *Dickson H. Leavens.* Gold maldistribution: *Howard Bowen.* Direct taxes by income classes: *Maxine Yaple.*

American Statistical Association, Journal—

September, 1936—An empirical method of calculating future population: *P. K. Whelpton.* The application of sampling to economic and sociological problems: *A. L. Bowley.* The practical side of trade association statistics: *C. W. Halligan.* Changes in the wholesale price index in relation to factory employment: *Irving Fisher*, with discussion by *Morris A. Copeland* and a rejoinder by *Irving Fisher.* The negro as a factor in the nation's labor force: *Alba M. Edwards.* The Swedish census of 1935–36: *Dorothy Swaine Thomas.* Rates of mental disease among certain population groups in New York State: *Benjamin Malzberg.*

December, 1936—Karl Pearson, 1857–1936: *Raymond Pearl.* Statistics on copper in the United States: *Y. S. Leong.* Probability distribution of protection test results: *Hugo Muench.* Improvement of statistical techniques in biology: *George W. Snedecor.* New system of population accounting in the Netherlands: *H. W. Methorst.*

Annals of Mathematical Statistics, September, 1936—On a method of testing the hypothesis that an observed sample of n variables and of size N has been drawn from a specified population of the same number of variables: *John W. Fertig.* On confidence ranges for the median and other expectation distributions for populations of unknown distribution form: *William R. Thompson.* The sampling distribution of the coefficient of variation: *Walter A. Hendricks* with the assistance of *Kate W. Robey.*

UNITED STATES—*Contd.*

Econometrica, October, 1936—Price data and problems of price research: *Frederick C. Mills.* The profit-experience of producers and their response to price—third report of the Econometrica Committee on Source Materials for Quantitative Production Studies: *E. H. Phelps Brown.* Demand for boots and shoes as affected by price levels and national income: *Victor S. von Szeliski* and *L. J. Paradiso.* Comments on the macrodynamic theory of business cycles: *M. Kalecki.* Annual survey of statistical techniques: the correlation and analysis of time series—Part II: *Charles F. Roos.*

Harvard Business Review, Vol. XV, No. 1—The money management powers of the Treasury and Federal Reserve Banks: *J. Franklin Ebersole.* Australian recovery and Government policy: *D. B. Copland.* The tax on undistributed income: *Robert H. Montgomery.* German advertising and its regulation during the last three years: *Fritz Redlich.*

Journal of Political Economy—

August, 1936—The quantity of capital and the rate of interest, I: *Frank H. Knight.* The motor carrier of 1935: *James C. Nelson.* A comparison of industrial growth in France and England from 1540 to 1640, II: *John U. Nef.* Some aspects of the double-taxation problem: *Carl F. Wehrwein.*

October, 1936—French population theory since 1800, I: *Joseph J. Spengler.* A comparison of industrial growth in France and England from 1540 to 1640, III: *John U. Nef.* Mr. Keynes on underemployment equilibrium: *Alvin H. Hansen.* An index of working-class purchasing power for Great Britain, 1929–35: *P. Sargant Florence.* Note on factors affecting our monetary supply: *Ira B. Cross.*

December, 1936—Wage subsidies as a remedy for unemployment: *Nicholas Kaldor.* French population theory since 1800, II: *Joseph J. Spengler.* Mr. Keynes on the rate of interest and the marginal efficiency of capital: *P. T. Ellsworth.*

Milbank Memorial Fund Quarterly, October, 1936—Changes in the death-rate since the seventeenth century: *Rene Sand.* A study of the effectiveness of certain administrative procedures in tuberculosis control: *Jean Downes.*

Quarterly Journal of Economics—

August, 1936—The pure theory of consumer's behaviour: *N. Georgescu-Roegen.* The agricultural adjustment act and the reports of the Brookings Institution: *F. B. Garver* and *Harry Trelogan.* The marketing machinery of the United States: *J. M. Cassels.* German cartel regulation under the decree of 1923: *William C. Kessler.* Payments between nations in the eighteenth and early nineteenth centuries: *Fritz Redlich.* The dilemma of central banking as illustrated in recent literature: *Winfield W. Riefler.*

UNITED STATES—*Contd.*

Quarterly Journal of Economics—Contd.

November, 1936—Prices and wages at Paris under John Law's system: *Earl J. Hamilton.* The controlled distribution of a crop among independent markets: *Frederick V. Waugh, Edgar L. Burtis*, and *Edgar L. Wolf.* Governmental controls and the theory of international trade and finance: *Charles R. Whittlesey.*

Review of Economic Statistics—

August, 1936—Quantitative input and output relations in the economic system of the United States: *Wassily W. Leontief.* Absorption of the United States debt: *Joseph B. Hubbard.* The cost of living and real wages in eighteenth century England: *Elizabeth W. Gilboy.* Dr. Neisser on secondary employment: note by *R. F. Karn* with a rejoinder by *H. Neisser.*

November, 1936—The League of Nations and business cycle research: *A. Loveday.* The measurement of industrial localization: *Edgar M. Hoover, Jr.* The mill demand for wool and inter-textile competition: *Julius T. Wendzel.*

Social Research, November, 1936—Proportional representation and the breakdown of German democracy: *F. A. Hermens.* Commentary on Keynes, I by *Hans Neisser*, II by *Emil Lederer.*

Wheat Studies of the Food Research Institute—

September, 1936—World wheat survey and outlook, September, 1936.

October, 1936—The timing of wheat marketing in Western Canada.

November, 1936—Wheat problems and policies in Germany, November, 1936.

BELGIUM—

Bulletin de l'Institut des Sciences Économiques—

Août, 1936—Problèmes de l'heure. La réduction de la durée du travail: *François Cracco.* Le rythme de développement des voies ferrées en Belgique de 1835 à 1935: *Leon Avakian.*

Novembre, 1936—Les tendances à l'autarchie économique dans l'Union Belgo-Luxembourgeoise depuis 1927: *Pierre Van der Rest.*

BULGARIA—

Revue de la Statistique Générale de la Bulgarie, Livraison II, 1936—De la loi relative aux petits nombres et de la série de Charlier dans la statistique mathématique: *N. Obrechkoff.* La mortalité de la population en Bulgarie pendant les années 1899–1902 et 1925–1928: *Stéphan Toteff.*

CHINA—

Nankai Social and Economic Quarterly, October, 1936—Problems of Chinese foreign exchange before and after the monetary reform: *W. Y. Lin.* Effects of the occupation of Manchuria on Japanese national economy: *A. J. Grajdanzev.*

DENMARK—

Nationaløkonomisk Tidsskrift—

Hefte 4, 1936—En Prisundersøgelse: *O. Strange Petersen.* En Engelsk Valuta-Enquête: *Alf. Ussing.*

Hefte 5, 1936—Det Danske Trafiksystem og de store Bro-og Vejplaner: *P. P. Sveistrup.* Om Balancen mellem Samfundsfaktorerne Kapital og Arbejde: *Leif Christensen.*

EGYPT—

L'Égypte Contemporaine—

March, 1936—The first national life tables for Egypt: *M. R. El-Shanawany* (whole number).

May, 1936—L'argent métal en 1936: *E. James.* Machinisme et progrès: *E. Pegna.*

FRANCE—

Bulletin de Statistique et de Législation Comparée, Avril, 1936—L'exploitation du monopole des allumettes en 1933.

Bulletin de la Statistique générale de la France, Juillet–Septembre, 1936—Tables de mortalité pour la population de la France, 1928–1933: *Michel Huber.* L'analyse statistique des aptitudes et des fonctions mentales: *Raoul Husson.*

Journal des Économistes, Juillet-Octobre, 1936—Les réformateurs et les réalités: *Edouard Payen.* La dévaluation du franc: *E. R.*

Journal de la Société de Statistique de Paris—

Octobre, 1936—Les principes de la statistique mathématique: *R. Risser.* Chômage et santé publique: *G. Ichok.*

Revue d'Économie Politique—

Juillet–Août, 1936—Endettement et productivité (à suivre): *Pierre Dieterlen.* Tendances actuelles de l'économie politique: *Wilhelm Ropke.* Les méthodes statistiques dans les études d'économie rurale aux États-Unis: *Magdelaine Apchie.* Étude d'un marché cartellisé. Le marché de l'étain: *Jean-Louis Cocta.* La vie économique en Allemagne: *Henry Laufenburger.*

Septembre–Octobre, 1936—L'économie française devant la dévaluation monétaire. Secteurs "abrité" et "non abrité." Retour vers l'equilibre? *Jean Dessirier.* Comment réduire l'inégalité des revenus? Essai d'une solution capitaliste du problème de la répartition: *Alfred Sauvy.* Une interprétation de la chute des prix depuis 1925: *Bertrand Nogaro.* La crise vue par un industriel: *Jean Dupin.*

Novembre–Decembre, 1936—Endettement et productivité (suite et fin): *Pierre Dieterlen.* Les codes Roosevelt et les résultats de la N.R.A.: *Louis R. Franck.* Un pays à monnaie chère: le Venezuela: *Pierre Denis.*

GERMANY—

Allgemeines Statistisches Archiv—

Heft 2, 1936—Bevolkerungsentwicklung und Wehrkraft: *Friedrich Burgdörfer.* Sport und Statistik: *Erich Schumann.* Die Wirtschaftsbeobachtung in der Grossunternehmung: *Anton Reithinger.* Verhandlungen der Deutschen Statistischen Gesellschaft am 25. Juni 1936 in Braunschweig. Statistik der Messen und Ausstellungen: *Dr. Kurt Propper.* Deutschlands Mitarbeit an der internationalen Statistik: *Friedrich Zahn.*

Heft 3, 1937—Der Stand der Erbkrankheiten im Deutschen Reich: *Max Beckh.* Selbstmord und Selbstmordversuch in Bulgarien: *Toma Stefanoff* and *Kurt Pohlen.* Wandlungen in der Statistik des Fremdenverkehrs: *August Busch.* Jubiläum des Mittleren Menschen: *Arnold Schwarz.*

Archiv für mathematische Wirtschafts- und Sozialforschung, Heft 3, 1936—Über die Verbindung des deduktiven und des statistischen Forschungsverfahrens mittels mathematischer Denkformen, dargestellt an der Statistik der vor- und nachgeburtlichen Sterblichkeit: *Felix Burkhardt.* Das Problem der "richtigen" Sterbetafel. Ein Beitrag zur mathematischen Statistik im Lebensversicherungs-Betrieb: *Carl Boehm.* Die französischen Capitalisations-Gesellschaften: *Heinrich Jecklin.*

Deutsches Statistisches Zentralblatt, Heft 4, 1936—Der statistische Unterricht an den deutschen Fachhochschulen: *Maximilian Meyer.*

Vierteljahrshefte zur Konjunkturforschung, Heft 2, *Teil A*, 1936—Das Geheimnis der Geganseltigkeit im Wirtschaftsleben (Das volkswirtschaftliche Prinzip): *Ernst Wagemann.* Technischer Fortschritt und Produktivität. Entwicklung und Wandlung der Sachgüterproduktion.

Weltwirtschaftliches Archiv—

September, 1936—Zum Problem der Währungsstabilisierung: *D. T. Jack.* Auswirkungen der Währungsabwertung: *S. E. Harris.* Kritische Bemerkungen zur Theorie der komparativen Kosten: *Walter Schramm.*

November, 1936—Internationale Kapitalbewegungen bei gebundener und freier Wahrung: *Charles R. Whittlesey.* Die Auswirkungen des Silberankaufsprogramms der amerikanischen Regierung auf den Handel zwischen den Vereinigten Staaten und China: *Erwin Graue.* Die automatische Deflation: *Gerhard Kroll.*

January, 1937—Die Beziehungen zwischen Kapitalmarkt und Industriewirtschaft in Frankreich: *Jean Marchal* and *Paul Hugon.* Arbeitseinsatz und Freihandel: *Erich Carell.*

HUNGARY—

Journal de la Société Hongroise de Statistique, Nos. 2–3, 1936—La statistique considérée au point de vue de la statistique sociale : *B. Földes.* Effets observés de la dénatalité due à la guerre : *A. Kovács.* Problèmes démographiques : *É. Varga.* Zur Methodik der Statistik der menschlichen Anhäufungsverhältnisse : *L. Thirring.* Sur les indices standard naturels complétant le calcul des standard : *Th. Szel.*

ITALY—

Annali di Statistica e di Economia, Anno III, Vol. IV, 1936—La funzione del tempo nella teoria economica : *Prof. P. N. Rosenstein Rodan.* Le fluttuazioni cicliche e la struttura della produzione : *A. M. Neuman* and *L. M. Lachmann.*

Le Assicurazioni Sociali—

Maggio–Giugno, 1936—Censimento delle abitazioni italiane. Qualche resultato : *Alfredo Niceforo.*

Settembre–Ottobre, 1936—Salario e provvidenze sociali : *Gherardo Casini.* I problemi dell'istruzione professionale in Italia : *Ugo Manunta.* Il villaggio collaborazionista : *Antonio De Sousa Gomez.*

Economia—

Agosto, 1936—Sull'iperfrazionamento demografico come causa di estinzione di talune popolazioni : *Livio Livi.* Contributi alla statistica economica dell'automobilismo : *Cesare Alimenti.*

Settembre, 1936—L'aumento di mascolinità delle nascite durante la guerra e la frequenza degli aborti : *Franco Savorgnan.* Produttività e prolificità lorda e netta della donna italiana (1931) : *Mario de Vergottini.*

Giornale degli Economisti—

Agosto, 1936—Risparmio abortivo : *Amedeo Gambino.* Aspetti fondamentali della finanza pubblica nazionale : *Francesco A. Répaci.*

Settembre, 1936—Gli addetti all'agricoltura nell'ottavo censimento della popolazione : *Paolo Albertario.* Su alcune discordanze tra gli indici misuratori delle disuguaglianze dei redditi : *Costantino Bresciani Turroni.*

Ottobre, 1936—Carattere costruttivo delle funzioni utilità nell' economia matematica : *G. Bruguier* and *B. Mania.* Tavole di nuzialità per la popolazione italiana (1930–32) : *Paolo Medani.*

Novembre, 1936—Il problema della distribuzione delle materie prime dall'aspetto politico internazionale : *G. Mortara.* Materie prime e indipendenza economica : *L. Lenti.* La distribuzione internazionale delle materie prime coloniali : *G. Demaria.* L'impero ed il problema italiano delle materie prime : *G. Balella.* Il problema della materie prime e la bilancia dei pagamenti internazionali : *G. Borgatta.*

JAPAN—

Kyoto University Economic Review, July, 1936—Taxation of pensions, annuities and bonuses: *Prof. M. Kambe.* The concentration and dispersion of Japan's foreign trade: *Prof. K. Taniguchi.* China's currency reform and its significance: *Asst. Prof. K. Matsuoka.*

POLAND—

Baltic Countries, September, 1936—The American Estonians: *Joseph Slabey Roucek.* International migrations during the economic crisis: *S. Fogelson.* Review of Danish economic conditions: *Jørgen Pedersen.* The economic situation of Poland: *Edward Lipiński.* Changes in the structure of Baltic trade: *Peter Heinz Seraphim.*

SWEDEN—

Index—

August, 1936—The world trade in tea: *William H. Ukers.*

September, 1936—The gold exchange paradox: *L. Albert Hahn.*

December, 1936—Economic survey.

Skandinaviska Kreditaktiebolaget, October, 1936—Sweden during the economic crisis: *Gustav Cassel.*

SWITZERLAND—

Journal de Statistique et Revue Économique Suisse—

II, 1936—Das Problem einer schweizerischen Produktionsstatistik: *Arnold Schwartz.* Moglichkeiten der Durchführung einer Produktionsstatistik im graphischen Gewerbe: *H. Marti.* Neue schweizerische Statistik: vom Eidgenossischen Statistischen Amt. Zur Struktur des Heimarbeitsentgeltes und zu seiner wirtschaftlichen Rolle: *J. Ernst.* Das Weltluftverkehrsnetz und seiner Gliederung (Sommer 1933): *Carl Hanns Pollog.*

III, 1936—Verschiedene Fragen der Bevölkerungsstatistik: *O. Schenker.*

INTERNATIONAL—

International Labour Review—

August, 1936—Family allowances in Belgium: *P. Goldschmidt.*

September, 1936—The twentieth session of the International Labour Conference. The land and the unemployed industrial worker in Great Britain: *P. Lamartine Yates.*

October, 1936—Mr. Keynes' "General Theory of Employment, Interest, and Money": *A. P. Lerner.* Vocational guidance in Italy: *Rosario Sottilaro.* Employment and remuneration of farm workers in Scotland.

November, 1936—A further contribution to the international comparison of rents: *Robert Guye.* Some effects of financial policy on the distribution of income in Great Britain since the War: *Ursula K. Hicks.* Japanese emigration: *Toru Ogishima.*

INTERNATIONAL—*Contd.*

International Labour Review—Contd.

December, 1936—The restoration of compulsory arbitration in New Zealand : *E. J. Riches.* The neglect of the human factor in the prevention of industrial accidents : *H. M. Vernon.*

International Review of Agriculture, November, 1936—International organisation of the rubber market. Farm accountancy in the Punjab (India) from 1927–33.

Metron, *Vol. XII*, *N.* 4, 1936—Dell' influenza che il raggruppamento delle singole modalità esercita sul valore di alcuni indici statistici nel caso di serie sconnesse: *C. Gini.* Das Wahrscheinlichkeitgesetz zweier wahrer einander zugeordneten Fehler und einige mit diesem zusammenhangende Betrachtungen: *H. Koeppler.* A note on the multiple correlation coefficient : *S. Kullback.* Die Analyse der Abhaengigkeitsverhaeltnisse in zwei Korrelation systemen: *S. Koller.*

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part IV, 1936, the Society has received the publications enumerated below:—

I.—OFFICIAL PUBLICATIONS.

(a) United Kingdom and its several Divisions.

United Kingdom—

Agriculture and Fisheries, Ministry of—

Economic series, No. 44. Milk: report of Reorganisation Commission for Great Britain. ix + 362 pp. 1*s*.

Bulletin No. 102. The cultivation and harvesting of sugar-beet on the Continent, by *F. Raynes* and *S. J. Wright*. v + 43 pp. 1*s*.

—— *Scottish Office—*

Agricultural marketing schemes, Report for the year 1935. 124 pp. 2*s*.

Development schemes, Report for the year 1935. 7 pp. 2*d*.

Foreign Office. Argentina, No. 1 (1936). Agreement between His Majesty's Government in the United Kingdom and the Argentine Government relating to trade and commerce . . . London, December 1, 1936. Cmd. 5324. 76 pp. 1*s*. 3*d*. [London: H.M.S.O., 1936. 9¾″ × 6″.]

General Register Office—

Census of England and Wales, 1931. Counties of: Chester (Part II), 35 pp., 2*s*.; Essex (Part II), 24 pp., 1*s*. 3*d*.; Gloucester (Part II), 24 pp., 1*s*. 3*d*.; Lincoln and Rutland (Part II), 24 pp., 1*s*. 3*d*.; Monmouth (Part II), 16 pp., 1*s*. London: H.M.S.O., 1936. 13¼″ × 8″. 5 parts.

Health, Ministry of. Housing Act, 1935. Report on the overcrowding survey in England and Wales, 1936. London: H.M.S.O., 1936. 13¼″ × 8¼″. xxiv + 157 pp. 8*s*.

Home Office. Royal Commission on the private manufacture of and trading in arms (1935–36), Report. London: H.M.S.O., 1936. 9¾″ × 6″. 101 pp. 1*s*. 6*d*.

Imperial Economic Committee—

Report 29. A survey of the trade in electrical machinery and apparatus. 9¾″ × 6″. 162 pp.

Dairy produce: a summary of figures of production and trade relating to butter, cheese, preserved milk, eggs, egg products. 9¾″ × 7¼″. 66 pp.

Dairy produce supplies 1935 including poultry and pig products: a supplement to Weekly Dairy Produce Notes. 13¼″ × 8¼″. 105 pp.

Fruit supplies in 1935, including vegetables, flowers and bulbs. A supplement to Weekly Fruit Intelligence Notes. 13¼″ × 8¼″. 99 pp.

Fruit: a summary of figures of production and trade relating to apples, pears, bananas, citrus fruit, grapes, wine, raisins and currants, canned fruit. 9¾″ × 7¼″. 82 pp.

Industrial fibres: a summary of figures of production, trade and consumption relating to cotton, wool, flax, silk, jute, hemp, and rayon. 9¾″ × 7¼″. 112 pp.

Meat: a summary of figures of production and trade relating to beef, mutton and lamb, bacon and hams, pork, cattle, sheep, pigs, canned meat. 9¾″ × 7¼″. 86 pp.

Plantation crops: a summary of figures of production and trade relating to sugar, tea, coffee, cocoa, spices, tobacco, and rubber. 9¾″ × 7¼″. 78 pp.

Supplies of canned and dried fruit 1935. 13″ × 8¼″. 87 pp.

Vegetable oils and oilseeds: a summary of figures of production and trade relating to cottonseed, linseed, rapeseed, sesame seed, soya beans, ground nuts, copra, palm kernels, palm oil, and olive oil. 9¾″ × 7¼″. 89 pp.

Wool production and trade 1935–36. 13″ × 8″. 78 pp.

[London: H.M.S.O., 1936. 2*s*. 6*d*. each.]

(a) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Labour, Ministry of. Report by a board of inquiry into the wages and hours of labour in the wool textile industry in Yorkshire (except wool combing). London: H.M.S.O., 1936. 9¾″ × 6″. 44 pp. 9*d.*

H.M. Land Registry. Registration of title to land. London: H.M.S.O., 1936. 13¼″ × 8″. 20 pp. 1*s.*

Medical Research Council—

Special report series, No. 215. Artificial pneumothorax: experience of the London County Council, by *F. J. Bentley.* 94 pp. 1*s.* 6*d.* 216. Medical uses of radium: summary of reports from research centres for 1935. 38 pp. 1*s.* 217. The relationship of the iodine contents of water, milk and pasture to the occurrence of endemic goitre in two districts of England, by the Committee on Iodine Deficiency and Thyroid Disease. 20 pp. 6*d.* 218. A dietary survey in terms of the actual foodstuffs consumed, by *E. P. Cathcart* and *A. M. T. Murray.* 56 pp. 1*s.* 6*d.* [London: H.M.S.O., 1936. 9¾″ × 6″.]

Meteorological Office—

Averages of temperature for the British Isles for periods ending 1935. 52 pp. 1*s.* 3*d.*

Averages of bright sunshine for the British Isles for periods ending 1935. 42 pp. 1*s.* [London: H.M.S.O., 1936. 9¾″ × 6″.]

H.M. Nautical Almanac Office. Interpolation and allied tables. Reprint from the *Nautical Almanac* for 1936. London: H.M.S.O., 1936. 9¾″ × 6¾″. [46] pp. 1*s.*

Overseas Trade, Department of—

Reports: 644. Roumania, March 1936. 62 pp. 1*s.* 3*d.* 645. Republic of Panama and the Panama Canal zone and Republic of Costa Rica (1933–35). 44 pp. 1*s.* 646. Chile, May 1936. 79 pp. 1*s.* 6*d.* 647. The Netherlands, March, 1936. 70 pp. 1*s.* 3*d.* 648. British East Africa. 57 pp. 1*s.* 6*d.* 649. Yugoslavia, May 1936. 44 pp. 1*s.* 650. Syria and the Lebanon, June, 1936. 39 pp. 9*d.* 651. New Zealand, April, 1936. 106 pp. 2*s.* 652. Portugal, July 1936. 87 pp. 1*s.* 6*d.* 653. Japan, June 1936. 138 pp. 2*s.* 6*d.* 654. Denmark, August 1936. 78 pp. 1*s.* 6*d.* 655. Canada. 2*s.* 656. Belgium, 1935. 124 pp. 2*s.* 657. Norway, June 1936. 100 pp. 2*s.* 658. India, 1935–36. 228 pp. 3*s.* 6*d.* 659. Australia, October 1936. 182 pp. 3*s.* [London: H.M.S.O., 1936. 9¾″ × 6″. 16 parts.]

Preston. Rates levied in various towns 1936–37. 52nd annual statement together with charges for gas and water supplies and average prices received for certain electricity supplies; also profits and losses on municipal undertakings by which rates in those towns have been reduced or increased. Preston: Borough Treasurer, 1936. 8″ × 10½″. 48 pp.

Scientific and Industrial Research, Department of. British regional geology. Scotland, the Northern Highlands, by *J. Phemister.* Edinburgh: H.M.S.O., 1936. 9¾″ × 6″. vi + 100 pp. 1*s.* 6*d.*

Scottish Office. Commissioner for the special areas in Scotland. Final report, by *Sir H. Arthur Rose.* Edinburgh: H.M.S.O., 1936. 9¾″ × 6″. 29 pp. 6*d.*

Tithe Redemption Commission. Tithe Act, 1936. Table for calculating the amount of a redemption annuity. London: H.M.S.O., 1936. 9¾″ × 6″. 7 pp. 6*d.*

Trade, Board of—

Cinematograph Films Act, 1927. Report of a Committee appointed by the Board. Cmd. 5320. 41 pp. 9*d.*

Fixed Trusts. Report of the Departmental Committee appointed by the Board, 1936. Cmd. 5259. 59 pp. 1*s.*

Import Duties Act Inquiry (1934), Part I. The textile trades, the leather and clothing trades, the food trades, the chemical and allied trades, miscellaneous trades, and a general summary statement. xii + 386 pp. 6*s.*

Paper showing how the provisions of the Trade Marks (Amendment) Bill, 1936, affect the Trade Marks Acts, 1905–1919. 63 pp. 1*s.*

(a) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Trade, Board of—Contd.

Survey of industrial development, 1935, particulars of factories opened, extended and closed in 1935, with some figures for 1934. iv + 36 pp. 9*d.* [London: H.M.S.O., 1936. 9¾″ × 6″.]

Transport, Ministry of—

London and Home Counties Traffic Advisory Committee, Report on Charing Cross Bridge. 12 pp. 6*d.*

Road and Rail Traffic Act, 1933. Licensing of goods vehicles: statistical information relating to goods vehicles authorised under carriers' licences at the 30th April, 1936. 11 pp. 6*d.*

Road traffic census, 1935. Report, including tables of statistics of traffic recorded on Class I roads in Great Britain at the general census taken in August 1935. 28 pp. 2*s.* [London: H.M.S.O., 1936. 13¼″ × 8¼″.]

Water Resources and Supplies, Report from the Joint Committee on Session 1935–36 together with the proceedings of the Committee, the minutes of evidence, and an appendix. London: H.M.S.O., 1936. 9¾″ × 6″. xxvii + 150 pp. 5*s.*

(b) Dominions, Colonies, and Protectorates.

India—

Commercial Intelligence and Statistics, Department of. Review of the trade of India in 1935–36 (62nd issue). Delhi, 1936. 9¾″ × 6½″. xviii pp. + 6 charts + 264 pp. 5*s.* 6*d.*

Australia—

Commonwealth Grants Commission. Third report (1936). Report on the applications made by the States of South Australia, Western Australia and Tasmania for financial assistance in 1936–37 from the Commonwealth under Section 96 of the Constitution. Canberra, 1936. 9½″ × 6″. 263 pp. 7*s.* 6*d.*

Canada—

Dominion Bureau of Statistics—

Seventh Census, 1931—

Census of agriculture. Alberta. xii + 85 pp. British Columbia. ci + 108 pp. Manitoba. cxii + 67 pp. New Brunswick. civ + 65 pp. Quebec. cxvi + 197 pp. Saskatchewan. cx + 89 pp. Ottawa, 1934–35. 6 parts. (From Mr. H. T. Curwen.) 9¾″ × 6½″.

Vol. IV. Cross-classification. Ottawa, 1934. 9½″ × 6¼″. xx + 1413 pp.

Vol. X. Merchandising and service establishments, Part I. Retail merchandise trade. Ottawa, 1934. 9¾″ × 6½″. lxxxiii + 1077 pp.

Southern Rhodesia—

Committee to enquire into the costs of distribution of imported goods and local products in Southern Rhodesia. Interim report on petrol and fuel oil. Salisbury, 1936. 13″ × 8″. 51 pp.

Tasmania—

Economic trends in Tasmania 1931–32 to 1935–36. The course of recovery: a survey prepared on behalf of the State Finance Committee, by *Professor F. R. E. Mauldon.* Hobart, 1936. 11″ × 8½″. iii + 18 pp.

Union of South Africa—

Mines, Department of. The mineral resources of the Union of South Africa with a summary of the mineral resources of South West Africa: compiled in the Office of the Geological Survey, Pretoria. Pretoria, 1936. 9¾″ × 7¼″. xiv + 454 pp. 1*s.*

(c) Foreign Countries.

Argentina—

Caja Nacional de Jubilaciones y Pensiones de Empleados Ferroviarios. Memoria correspondiente a los años 1934 y 1935. Buenos Aires, 1936. 10¾″ × 7″. 128 pp.

Belgium—

Banque Nationale de Belgique—

Bulletins d'information et de documentation. Vol. I, No. 9; Vol. I, No. 12; Vol. II, No. 1; Vol. II, No. 2. Bruxelles, 1936. 11¾″ × 8¾″.

Office Central de Statistique—

Population. Recensement général au 31 décembre 1930, Tome II. Bruxelles, 1936. 12½″ × 9½″. 179 + 3 + 13 + 21 + 21 + 25 + 25 + 23 + 15 + 11 + 21 pp.

Bolivia—

Ministerio de Minas y Petroleo—

Investigacion del estaño en Bolivia. El estaño en Bolivia, 1935. La Paz, 1936. 8½″ × 6″. 179 pp. + 43 maps and charts + xii pp.

Cuba—

Dirección General de Estadística—

Circulación monetaria y movimiento bancario 1926–1935. Habana, 1936. 13″ × 8½″. [3] + 38 fols. typewritten.

Estadistica de ferrocarriles y tranvias. Habana, 1936. 13″ × 8½″. 2 + 29 fols. typewritten.

Czechoslovakia—

Office de Statistique—

Fortune des personnes physiques, relevée dans la Province Moravo-Silésienne, en Slovaquie, en Russie Subcarpathique et dans la République Tchéchoslovaque entière, lors de l'établissement de la taxe sur la fortune en 1919. Prague, 1935. 12″ × 9¼″. 163 pp. 45 *Kc.*

Denmark—

Det Statistiske Departement—

Statistiske Meddelelser 4 Raekke, 100 Bind, 1 Haefte. Husholdningsregnskaber 1931. 63 + 212 pp. 101 Bind, 1 Haefte. Folkemaengden 5 November 1935 i Kongeriget Danmark. 236 pp. 102 Bind, 1 Haefte. De nordiske statistiske Møder i København i Maj 1936. 204 pp. 9¼″×5¾″.

Estonia—

Eesti Pank. Estonian economic year-book for 1935. Tallinn: Eesti Pank, 1936. 9¾″ × 7″. 110 pp.

France—

Ministère des Travaux Publics. Direction des Mines. Statistique de l'industrie minérale et des appareils à vapeur en France, en Algérie, dans les colonies, pays de protectorat et territoires sous mandat français . . . 1933 et 1934. Deuxième fascicule. Volume du centenaire. Paris, 1936. 13″ × 9¾″. xxi + 146 pp. 100 *fr.*

Statistique Générale de la France—

Résultats statistiques du recensement général de la population effectué le 8 mars 1931. Tome I. Quatrième partie. Etat civil de la population active. Paris, 1936. 10½″ × 8½″. 90 pp.

Rapport au Président du Conseil relatif aux échelles de traitements, remises et indemnités fixes des fonctionnaires, agents, sous-agents et ouvriers de l'état, rémunérés au mois . . . 1931–36. Paris: extrait du *Journal Officiel,* 1936. 12″ × 9½″. pp. 1247–1345.

(c) **Foreign Countries**—*Contd.*

Germany—

Institut für Konjunkturforschung. Sonderhefte: 41. Die Bedeutung des Aussenmarktes für die deutsche Industriewirtschaft. 71 pp. 6.80 *Rm.* 42. Leistungen und Aufgaben im Deutschen Wohnungs- und Siedlungsbau. 71 pp. 9.80 *Rm.* [Berlin, 1936. 11¾" × 8¼".]

Statistisches Reichsamt—

Statistik des Deutschen Reichs, Band 492. Der Steuerabzug vom Arbeitslohn in den Jahren 1932 und 1934. Berlin, 1937. 12" × 8½". 286 pp. 15 *Rm.*

Baden. Badischen Statistischen Landesamt. Ergebnisse der Volkszählung vom 16 Juni 1933 in Baden nach der Neueinteilung der inneren Verwaltung auf Grund des Gesetzes vom 30 Juni, 1936. Karlsruhe, 1936. 11¼" × 7½". 24 pp.

Hungary—

Office Royal Hongrois de Statistique—

Recensement général de la population en 1930. IVe partie. Les professions exercées par la population, combinées avec les principales données démographiques. Ve partie. Démographie détaillée. Budapest, 1936. 10½" × 7½". xxxi + 376 pp.

Italy—

Istituto Centrale di Statistica—

Statistiche intellettuali. Vol. 10. Statistica dell'istruzione media per l'anno scolastico 1931–32. Vol. II. Statistica dell'istruzione superiore per l'anno accademico 1931–32. [Rome, 1936. 10¼" × 7¼".]

Netherlands Indies—

Departement van Economische Zaken—

Census of 1930 in the Netherlands Indies. Vol. VIII, Summary of vols. I–VII. Batavia, 1936. 13½" × 9¼". xv + 127 pp + 1 map.

Norway—

Det Statistiske Centralbyrå—

Statistisk-økonomisk oversikt over året 1936. Oslo, 1937. 10¾" × 7½". 72 pp. *Kr.* 1.00

Statens Kornforretning—

Mylnor og kvernar i Norge etter uppteljingar i 1927–29. 2 Bolken. Oslo, 1936 (Norges Offisielle Statistikk IX. 77.) 9½" × 6¼". 265 pp. + 1 map.

Palestine—

Jewish Agency for Palestine—

15 years of Jewish immigration into Palestine 1919–1934, by *David Gurevich.* Jerusalem: Statistical Bulletin No. 24, 1935. 11" × 7¾". 62 + xlviii pp.

Poland—

Office Central de Statistique—

Statistique de la Pologne. Série C. Fasc. 36. Deuxième recensement général de la population du 9.xii.1931. Departement de Wilno. xxx + 164 pp. 41. Problèmes démographiques de la Pologne: mouvement naturel de la population depuis 1895 jusqu'à 1935. Exactitude de l'enregistrement des naissances et des décès. Naissances multiples. xii + 208 pp. [Warsaw, 1936. 11½" × 8¼".]

Switzerland—

Basel-Stadt. Statistisches Amt—

Statistisches Jahrbuch des Kantons Basel-Stadt, 1935. 15 Jahrgang. Basel, 1936. 9½" × 6½". xvi + 382 pp.

(c) Foreign Countries—*Contd.*

Ukraine—

Académie des Sciences de la RSS d'Ukraine—

Travaux de l'Institut de Démographie, Tome X. Le recensement de la population (Histoire et organisation actuelle des recensements dans l'URSS et dans les pays capitalistes). Kiev, 1936. 10½" × 7". 195 pp. [Russian text.]

United States—

Agriculture, Department of—

Agricultural statistics 1936. 421 pp. 25 c.

Farmers' Bulletin No. 1757. Diets to fit the family income. 37 pp.

Statistical Bulletin No. 53. Carlot shipments and unloads of nineteen important fruits and vegetables for the calendar years 1933 and 1934. 206 pp. 15 c.

Technical Bulletins: 517. Cotton fabrics as affected by variations in pressure and in length of exposure during ironing. 32 pp. 5 c. 522. Incomplete milking in relation to milk production and udder troubles in dairy cows. 26 pp. 5 c.

Census, Bureau of the—

Mental defectives and epileptics in institutions 1934. 23 pp. 10 c.

Patients in hospitals for mental disease 1934. 45 pp. 10 c.

Children's Bureau. Publication No. 232. Juvenile court statistics and Federal juvenile offenders 1933. 114 pp. 10 c.

Education, Office of—

Bulletins: 5. Bibliography of research studies in education 1934–1935. 287 pp. 25 c. 7. Instruction in hygiene in institutions of higher education. 47 pp. 10 c. 9. Testing practices of high school teachers. 42 pp. 10 c.

Leaflet, No. 37. Physique of school children. 17 pp. 5 c.

Foreign and Domestic Commerce, Bureau of. The balance of international payments of the United States in 1935. ix + 86 pp. 10 c.

Women's Bureau. Bulletin No. 146. A policy insuring value to the woman buyer and a livelihood to apparel makers. 21 pp. 10 c.

[Washington, 1936. 9" × 6".]

(d) International.

International Institute of Agriculture—

World agricultural situation in 1934–35 (world agriculture: conditions and trends; markets and prices. Agricultural policies and conditions in the different countries). Economic commentary on the International Year-book of Agricultural Statistics for 1934–35. Rome, 1936. 9½" × 6½". 533 pp. 25 *lire.*

International Labour Office—

Industrial environment and health: practical methods of investigation. Geneva, 1936. 6¾" × 4¾". 336 pp. 7*s.* 6*d.*

Studies and Reports—

Series A. No. 39. Collective agreements. viii + 286 pp. 6*s.*

Series C. No. 21. The social consequences of the economic depression, by *Wladimir Woytinsky.* xi + 364 pp. 7*s.* 6*d.*

Series M. No. 13. International survey of social services 1933. Vol. II. viii + 530 pp. 10*s.* 6*d.*

Series N. No. 21. Maritime statistical handbook. I, Salaries and wages of merchant marine personnel. II, Number of merchant marine personnel. III, Classification of sea-going merchant tonnage. viii + 223 pp. 5*s.*

Series O. No. 6. World statistics of aliens: a comparative study of census returns 1910–1920–1930. vii + 251 pp. 10*s.* 6*d.* Geneva (London, P. S. King), 1936. 9½" × 6½".

(d) **International**—*Contd.*

League of Nations—

Economic Committee—

Equality of treatment in the present state of international commercial relations. The most-favoured-nation clause. 26 pp.

Remarks on the present phase of international economic relations. Reconstruction of the machinery of international exchange as a factor in recovery and appeasement, together with observations by the Financial Committee. 10 pp.

[Geneva (London: Allen and Unwin), 1936. 10½″ × 8¼″.]

Economic and Financial Section—

Balances of payments 1935. 10½″ × 8¼″. 176 pp. 6*s.*

International trade in certain raw materials and foodstuffs by countries of origin and consumption, 1935. 10½″ × 8¼″. 146 pp. 4*s.*

International trade statistics, 1935. 10½″ × 8¼″. 370 pp.

Problem of nutrition, Vol. II. Report on the physiological bases of nutrition. 9½″ × 6¼″. 27 pp. 6*d.* Vol. IV. Statistics of food production, consumption, and prices. Documentation prepared by the International Institute of Agriculture presented to the Mixed Committee on the Problem of Nutrition. June 4, 1936. 10½″ × 7½″. 110 pp. 3*s.*

Review of world trade 1935. 10½″ × 8¼″. 85 pp. 2*s.* 6*d.*

Statistical year-book, 1935–36. 9¾″ × 7¼″. 339 pp. 10*s.*

World economic survey. Fifth year 1935–36. 9½″ × 6¼″. 338 pp. 6*s.*

World production and prices 1935–36. 10½″ × 8¼″. 156 pp. 5*s.*

[Geneva (London: Allen and Unwin), 1936.]

II.—AUTHORS AND MISCELLANEOUS.

Actuarial Society of America and Association of Life Insurance Medical Directors, New York. Impairment study 1936. New York: 1936. 10¾″ × 8½″. 22 pp.

Aftalion (*Albert*). L'équilibre dans les relations économiques internationales. Paris: les Éditions Domat-Montchrestien, 1937. 9″ × 5¾″. 466 pp. 60 *fr.*

Agricultural Economists, Fourth International Conference of, held at St. Andrews, Scotland, 30 August to 6 September, 1936, Proceedings of. London: Oxford University Press, 1937. 9″ × 6″. xiv + 528 pp. 17*s.* 6*d.*

American Association of Collegiate Schools of Business. Proceedings of the eighteenth annual meeting . . . held at Harvard Graduate School of Business Administration, Soldiers Field, Boston, Mass. April 1936. Edited by *Charles C. Fichtner*, Secretary. Fayetteville, Arkansas: University of Arkansas, 1936. 9″ × 6″. pp. $2.50.

Ault (*Otho C.*) and *Eberling* (*Ernest J.*). Principles and problems of economics. New York, London, etc.: Longmans Green, 1936. 8½″ × 5½″. viii + 843 pp. 21*s.*

Bank of England. Reference Library catalogue. London, 1936. 10″ × 8″. 547 pp.

Barnard (*M. M.*). An examination of the sampling observations on wheat of the crop-weather scheme. Cambridge: reprint from *Journal of Agricultural Science*, Vol. XXVI, Part III, July 1936. pp. 457–487. 10″ × 7″.

Barth (*Karl*). Das Bevölkerungsproblem und seine Auswirkung in der neuen deutschen Steuerreform. (Würzburger Staatswissenschaftliche Abhandlungen, Reihe A. Heft 5). Leipzig: Hans Buske, 1936. 9¼″ × 6¼″. 158 pp. 4.50 *Rm.*

Bartlett (*M. S.*). The information available in small samples. Cambridge: reprint from *Proceedings of the Cambridge Philosophical Society*, Vol. XXXII, Part IV, October, 1936. Pp. 560–566. 10″ × 7″.

—— Statistical information and properties of sufficiency. London: reprinted from *Proceedings of Royal Society of London.* Series A, No. 881, pp. 124–137, March, 1936. 10″ × 7″.

II.—Authors and Miscellaneous—*Contd.*

Bartlett (*M. S.*). The statistical estimation of *G*. Cambridge: reprint from *British Journal of Psychology* (General Section), Vol. XXVI, Part 2. October, 1935. Pp. 199–206. 10″ × 7″.

—— and *Greenhill* (*A. W.*). The relative importance of plot variation and of field and laboratory sampling errors in small plot pasture productivity experiments. Cambridge: reprint from *Journal of Agricultural Science*, April, 1936. Pp. 258–262. 10¼″ × 7¼″.

Beard (*Gilbert*). Prices and prosperity. Manchester: Kennedy Press, 1936. 8½″ × 5½″. 79 pp. 1*s*. 6*d*.

Bevölkerungsfragen Bericht des Internationalen Kongresses für Bevölkerungswissenschaft Berlin 26 August–1 September, 1935. Herausgegeben im Auftrage des Präsidenten und des Arbeitsausschusses vom *Dr. Hans Harmsen* und *Dr. Franz Lohse*. Munich: J. F. Lehmanns Verlag, 1936. 9¾″ × 6½″. xxvi + 972 pp.

Bezanson (*Anne*), *Gray* (*Robert D.*) and *Hussey* (*Miriam*). Wholesale prices in Philadelphia 1784–1861. Philadelphia: University of Pennsylvania Press, 1936. 9″ × 6½″. xxiii + 443 pp. $4.

Boekman (*E.*). Demografie van de Joden in Nederland. Amsterdam: Menno Hertzberger, 1936. 10¼″ × 7½″. 140. pp.

Bratt (*Elmer C.*). Business cycles and forecasting. Chicago: Business Publications, 1937. 9″ × 6″. xiii + 501 pp.

Busschau (*W. J.*). The theory of gold supply, with special reference to the problems of the Witwatersrand. London: Oxford University Press, 1936. 8¾″ × 5½″. x + 193 pp. 10*s*. 6*d*.

Canadian Bankers' Association, Journal. Vol. XXV, No. 4, July, 1918, to Vol. XXXVIII, No. 3, April, 1931 [lacking 16 parts]. Vol. XXXIX, No. 1, October, 1931, to Vol. XLIII, No. 1, October, 1935. Toronto. 9½″ × 6″. (From Dr. J. Bonar.)

Carnegie Endowment—International Chamber of Commerce Joint Committee. International economic reconstruction: an economists' and business men's survey of the main problems of to-day. 9¾″ × 6¼″. 225 pp.

—— Separate memoranda from the economists consulted by the Joint Committee on the improvement of commercial relations between nations and the problems of monetary stabilization, followed by the practical conclusions of the Committee of Experts, June, 1936. xii + 417 pp. Paris: International Chamber of Commerce, 1936. 9¾″ × 6¼″.

Clare (*George*) and *Crump* (*Norman*). The ABC of the foreign exchanges: a practical guide. 10th ed. London: Macmillan, 1936. 7¼″ × 5″. xxi + 393 pp. 5*s*.

Clark (*Colin*). National income and outlay. London: Macmillan, 1937. 8½″ × 5½″. xix + 303 pp. 12*s*. 6*d*.

Coote (*James A.*). A graphical survey of the Canadian textile industries. (McGill Social Research Series No. 4.). Montreal: McGill University (London: H. Milford), 1936. 10″ × 7″. viii + 248 pp. 6*s*. 6*d*.

Davenport (*C. B.*) and *Ekas* (*Merle P.*). Statistical methods in biology, medicine and psychology. 4th ed. New York: John Wiley (London: Chapman and Hall), 1936. 7″ × 4¼″. xii + 216 pp. 13*s*. 6*d*.

Dieulefait (*Carlos E.*). Théorie de la corrélation. Rosario: Universidad Nacional del Litorol Facultad de Ciencias Economicas, 1935. 11″×8″. 71 pp.

Edge (*P. Granville*). The contents of colonial medical reports. London: reprint from Supplement to the *Tropical Diseases Bulletin*, October, 1936. Pp. 3–6. 9½″ × 6″.

Elsas (*M. J.*). Umriss einer Geschichte der Preise und Löhne in Deutschland, vom Ausgehenden Mittelalter bis zum Beginn des Neunzehnten Jahrhunderts. Erster Band. Leiden: A. W. Sijthoff's Uitgeversmij N.V., 1936. 10″ × 6½″. ix + 808 pp. *Fl.* 12.50.

Evans (*George Heberton*). British corporation finance, 1775–1850: a study of preference shares. Baltimore: Johns Hopkins Press (London: Oxford University Press), 1936. 8½″ × 5½″. 208 pp. 10*s*. 6*d*.

Fisher (*R. A.*). Statistical methods for research workers. 6th ed. Edinburgh and London: Oliver and Boyd, 1936. 8¾″ × 5½″. xiii + 339 pp. 15*s*.

II.—Authors and Miscellaneous—*Contd.*

Friend (*G. E.*). The schoolboy: a study of his nutrition physical development and health . . . with a foreword by *J. C. Drummond*. Cambridge: Heffer, 1935. 8½″ × 5½″. ix + 128 pp. 7*s*. 6*d*.

Gheorghiu (*Panait R.*). The foreign trade of Roumania, from the Treaty of Adrianople up to the great depression. Bucarest, 1936. 9¼″ × 6¼″. vii + 240 pp. 6*s*. 6*d*.

Goodrich (*Carter*) and others. Migration and economic opportunity: the report of the study of population redistribution. Philadelphia: University of Pennsylvania Press (London: H. Milford), 1936. 10″ × 6¾″. xvii + 763 pp. 22*s*. 6*d*.

Haberler (*Gottfried von*). The theory of international trade, with its applications to commercial policy. Translated from the German by *Alfred Stonier* and *Frederic Benham*. London, etc.: William Hodge, 1936. 9¾″ × 6″. xv + 408 pp. 21*s*.

Harrod (*R. F.*). The trade cycle: an essay. Oxford: Clarendon Press. 1936. 8¾″ × 5½″. ix + 234 pp. 10*s*.

Holmes (*R. L. A.*). Statistics for professional students. London: Pitman, 1936. 8½″ × 5½″. xii + 163 pp. 5*s*.

Hutt (*W. H.*). Economists and the public: a study of competition and opinion. London: Jonathan Cape, 1936. 9¾″ × 5¾″. 377 pp. 15*s*.

Incorporated Society of British Advertisers Ltd. The readership of newspapers and periodicals in Great Britain 1936. London, 1936. 11″ × 9″. 387 pp.

Illinois University, Bureau of Business Research. Bulletin No. 53. Capacity to pay current debts, by *Arthur H. Winakor*. 54 pp.

—— No. 54. A balance sheet of the nation's economy, by *F. G. Dickinson* and *F. Eakin*. 35 pp. [Urbana, 1936. 9″ × 6″.]

Karve (*D. G.*). Poverty and population in India. London: H. Milford, 1936. 7¼″ × 4½″. 127 pp. 4*s*. 6*d*.

Knight (*A. W.*). Abolish slumps: a diagnosis of the trade cycle. London: P. S. King, 1936. 7¼″ × 4¾″. vi + 142 pp. 6*s*.

Kucynski (*J.*). Labour conditions in Western Europe 1820 to 1935. London: Lawrence and Wishart, 1936. 8½″ × 5¼″. vii + 118 pp. 4*s*. 6*d*.

Levy (*H.*) and *Roth* (*L.*). Elements of probability. Oxford: Clarendon Press, 1936. 8¾″ × 5½″. x + 200 pp. 15*s*.

Lucas (*Arthur Fletcher*). Industrial competition and the control of competition: the British experiments. London and New York: Longmans Green, 1937. 8½″ × 5¼″. xi + 384 pp. 15*s*.

Macfie (*Alec L.*). An essay on economy and value: being an enquiry into the real nature of economy. London: Macmillan, 1936. 8½″ × 5½″. xi + 152 pp. 7*s*. 6*d*.

Marschak (*J.*) and *Lederer* (*W.*). Kapitalbildung. London, Edinburgh, etc.: William Hodge, 1936. 9¼″ × 6¼″. viii + 315 + [1] pp. 10*s*. 6*d*.

Marshall (*A. H.*). Local authorities: internal financial control. London: Institute of Public Administration, 1936. 9½″ × 6½″. viii + 218 pp. 7*s*. 6*d*.

Marshall (*Herbert*), *Southart* (*Frank A.*) and *Taylor* (*Kenneth W.*). Canadian-American industry: a study in international investment . . . with an excursus on the Canadian balance of payments, by *Frank A. Knox*. New Haven: Yale University Press (London: Oxford University Press), 1936. 9½″ × 6½″. x + 360 pp. 13*s*. 6*d*.

Martin (*W. J.*). Phthisis and physical measurements in Wales. Cambridge: reprint from *Journal of Hygiene*, Vol. XXXVI, No. 4, 1936. Pp. 540–546. 10″ × 7″.

—— Studies in the declining birth-rate, Wales and South England. Cambridge: reprint from *Journal of Hygiene*, Vol. XXXVI, No. 3, 1936. Pp. 402–437. 10″ × 7″.

Meade (*J. E.*). An introduction to economic analysis and policy. Oxford: Clarendon Press, 1936. 7½″ × 5½″. xv + 392 pp. 2 charts. 10*s*.

Mills (*Frederick C.*). Prices in recession and recovery: a survey of recent changes. New York: National Bureau of Economic Research in cooperation with the Committee on Recent Economic Changes, 1936. (London: Macmillan). 9″ × 6″. xv + 581 pp. 16*s*.

II.—Authors and Miscellaneous—*Contd.*

Milnes (*Nora*). A study of industrial Edinburgh and the surrounding area, 1923–1934. Vol. I. London: P. S. King, 1936. 8½″ × 5½″. vii + 270 pp. 12*s*. 6*d*.

Mitchell (*E. Lawrence*). The Tithe Act, 1936, with the addition of a table for calculating the amount of a redemption annuity. London: published jointly by the Land Agents' Society, Central Landowners' Association, and the Chartered Surveyors' Institution, 1936. 8½″ × 5½″. 36 pp. 1*s*. 6*d*.

Neisser (*Hans*). Some international aspects of the business cycle. Philadelphia: University of Pennsylvania Press, 1936. 9″ × 6″. xiv + 176 pp. $2.50.

P. E. P. (Political and Economic Planning). Report on the supply of electricity in Great Britain: a survey of present-day problems of the industry with proposals for re-organisation of electricity distribution. London: *P. E. P.*, 1936. 10″ × 8″. 171 pp. 6*s*.

Pfister (*Bernhard*). Sozialpolitik als Krisenpolitik. Stuttgart and Berlin: W. Kohlhammer, 1936. 9½″ × 6½″. viii + 283 pp. 9 *Rm*.

Pohlen (*Kurt*). Gesundheitsstatistisches Auskunftsbuch fur das Deutsche Reich. Ausgabe 1936. Bearbeitet im Reichsgesundheitsamt von *Dr. Kurt Pohlen*. . . . Berlin: Richard Schoetz, 1936. 9¼″ × 6¼″. xvi + 333 pp. 11.80 *Rm*.

Porteous (*D. A.*). Pension and widows' and orphans' funds. (Institute of Actuaries Students' Society's consolidation of reading series.) Cambridge: University Press, 1936. 8¾″ × 5½″. xii + 111 pp. 7*s*. 6*d*.

Quarterly Journal of Economics. Index 1886–1936. Cambridge, Mass.: Harvard University Press. (London: H. Milford). 1936. 9¼″ × 5¾″. 138 pp.

Robinson (*Joan*). Essays in the theory of employment. London: Macmillan, 1937. 8½″ × 5¼″. vii + 255 pp. 8*s*. 6*d*.

Ronk (*S. E.*). Prices of farm products in New York State, 1841–1935. Ithaca, N.Y.: Cornell University Agricultural Experiment Station, 1936. 9″ 6″. 76 pp. (From *Prof. F. A. Pearson.*)

Rountree (*G. Meredith*). The railway worker: a study of the employment and unemployment problems of the Canadian railways. Edited by *Leonard C. Marsh*, with an introduction by *J. C. Hemmeon*. Toronto: for McGill University Press, by the Oxford University Press, 1936. 8½″ × 5¼″. xx + 364 pp. 12*s*. 6*d*.

Rowse (*A. L.*). Mr. Keynes and the Labour movement. London: Macmillan, 1936. 7½″ × 5″. x + 68 pp. 2*s*. 6*d*.

Russell (*W. T.*). Statistical study of the sex ratio at birth. Cambridge: from the *Journal of Hygiene*, Vol. XXXVI, No. 3, 1936, pp. 381–401. 10″ × 7″.

Say (*Jean Baptiste*). Letters to Thomas Robert Malthus on political economy and stagnation of commerce. . . . Translated London, 1821. With an historical preface by *Harold J. Laski*. London: George Harding, 1936. 8¾″ × 5¾″. 75 pp. 5*s*.

Schumann (*Hans Joachim*). Staandortsänderungen der Industrien in Grossbritannien seit dem Kriege. Langensalza, Berlin: Julius Beltz, 1936. 9½″ × 6½″. 99 pp. 3 *Rm*.

Shirras (*G. Findlay*). Science of public finance. 3rd ed. (completely revised and rewritten). London: Macmillan, 1936. 8¼″ × 5¼″. 2 vols. 42*s*.

Smith (*W. Millar*). The marketing of Australian and New Zealand primary products. London: Pitman, 1936. 8½″ × 5¼″. xvii + 352 pp. 12*s*. 6*d*.

Stamp (*Sir Josiah*). The fundamental principles of taxation in the light of modern developments. New and revised edition. London: Macmillan, 1936. 8¾″ × 5¼″. xiii + 220 pp. 10*s*. 6*d*.

Swan (*Joseph P.*). The vaccination problem. London: C. W. Daniel Co., 1936. 8½″ × 5½″. 346 pp. 5*s*.

van Dorp (*E. C.*). A simple theory of capital, wages and profit or loss: a new and social approach to the problem of economic distribution. London: P. S. King, 1937. 8½″ × 5½″. xv + 260 pp. 12*s*.

Vasiliu (*Vasile G.*). The income tax in Great Britain and Roumania: a comparative study. Bucarest, 1936. 9″ × 6¼″. xii + 416 pp.

II.—Authors and Miscellaneous—*Contd.*

Verein für Geographie und Statistik, Frankfurt am Main. Festschrift zur Hundertjahrfeier des Vereins für Geographie und Statistik zu Frankfurt am Main. 9 Dezember 1836–9 Dezember 1936. Frankfurt am Main: Ludwig Ravenstein, 1936. 11¾″ × 8¼″. xii + 438 pp. 6 maps.

Walton (*Dudley W.*). Statistics in the service of engineering. . . . Excerpt from the *Transactions of the Liverpool Engineering Society*, Vol. LVII, pp. 207–232. Liverpool: 1936. 8½″ × 5½″.

Whitehead (*T. N.*). Leadership in a free society: a study in human relations based on an analysis of present-day industrial civilization. London: Oxford University Press, 1936. 8¾″ × 5¼″. xv + 256 pp. 10*s*. 6*d*.

Wickwar (*W. Hardy*). The social services: a historical survey. London: Cobden-Sanderson, 1936. 8½″ × 5½″. 268 pp. 10*s*. 6*d*.

Wolman (*Leo*). Ebb and flow in trade unionism. New York: National Bureau of Economic Research, 1936. (London, Macmillan.) 9″ × 6″. xviii + 251 pp. 10*s*. 6*d*.

World Power Conference. Statistical year-book . . . No. 1, 1933 and 1934. Edited with an introduction and explanatory text by *Frederick Brown*. London: Central office, World Power Conference, 1936. 11″ × 8½″. 111 pp. 20*s*.

Yates (*F.*). A new method of arranging variety trials involving a large number of varieties. Cambridge: from the *Journal of Agricultural Science*, Vol. XXVI, Pt. III, July 1936, pp. 425–455. 10″ × 7″.

REVENUE OF THE UNITED KINGDOM.

Net Produce in Quarters of **1936**, *and in Financial Years ended March* **31, 1935-36, 1934-35, 1933-34, 1932-33.**

(000's omitted.)

QUARTERS, ended	March 31, 1936.	June 30, 1936.	Sept. 30, 1936.	Dec. 31, 1936.	Total for calendar year 1936.
	£	£	£	£	£
Customs	48,314	49,820	54,486	54,604	207,224
Excise	23,800	25,100	26,800	32,400	108,100
Stamps and Estate Duties	33,060	24,740	27,790	29,250	114,840
Land Tax and Mineral Rights Duty	625	90	40	20	775
Postal Service Telegraph Service Telephone Service	18,550	18,550	20,800	22,850	80,750
	124,349	118,300	129,916	139,124	511,689
Property and Income Tax, including Super Tax	199,958	14,755	38,294	33,317	284,324
	324,307	133,055	168,210	172,441	798,013
Excess Profits Duties Corporation Profits Tax	1,300	—	—	—	1,300
Motor Vehicles Duties	20,205	4,620	3,753	2,963	31,541
Crown Lands	310	290	340	420	1,360
Interest on Sundry Loans	1,293	370	2,549	717	4,929
Miscellaneous and Special Receipts	4,893	1,756	10,513	3,028	20,190
	352,308	141,091	185,365	179,569	857,333

YEARS, ended March 31,	1935-36.	1934-35.	1935-36 (compared with 1934-35).		Corresponding years.	
			Increase.	Decrease.	1933-34.	1932-33.
	£	£	£	£	£	£
Customs	196,642	185,096	11,546	—	179,177	167,235
Excise	106,700	104,600	2,100	—	107,000	120,900
Stamps and Estate Duties	113,720	105,466	8,254	—	107,980	96,360
Land Tax and Mineral Rights Duty	785	770	15	—	800	770
Postal Service Telegraph Service Telephone Service	77,750	74,000	3,750	—	72,400	70,200
	495,597	469,932	25,665	—	467,357	455,465
Property and Income Tax, including Super Tax	289,094	280,042	9,052	—	281,522	312,189
	784,691	749,974	34,717	—	748,879	767,654
Excess Profits Duties Corporation Profits Tax	1,300	2,300	—	1,000	1,800	2,200
Motor Vehicle Duties	30,752	31,538	—	786	30,712	27,910
Crown Lands	1,360	1,320	40	—	1,230	1,220
Interest on Sundry Loans	4,934	4,372	562	—	4,653	5,125
Miscellaneous— Ordinary receipts Special receipts	21,738	15,125	6,613	—	22,103	22,922
Total	844,775	804,629	41,932	1,786	809,379	827,031
			NET INCR. £40,146			

Values (c.i.f.) of **Imports*** *into the United Kingdom for the years* **1934–35–36.**

(From the Monthly Trade Returns, December, 1936.)

	Year ended December 31,			Increase or Decrease, 1936—1935.	Increase or Decrease, 1936—1934.
	1934.	1935.	1936.		
	£	£	£	£	£
I. FOOD, DRINK AND TOBACCO—					
A. Grain and flour	54,390,606	56,731,969	69,575,056	+12,843,087	+15,184,450
B. Feeding-stuffs for animals	7,429,216	7,712,089	8,483,025	+ 770,936	+ 1,053,809
C. Animals, living, for food	5,265,106	5,569,506	7,241,407	+ 1,671,901	+ 1,976,301
D. Meat	81,518,831	77,759,114	78,829,394	+ 1,070,280	− 2,689,437
E. Dairy produce	52,882,659	58,419,229	67,367,166	+ 8,947,937	+14,484,507
F. Fresh fruit and vegetables	35,174,031	39,123,530	37,071,417	− 2,052,113	+ 1,897,386
G. Beverages and cocoa preparations	44,400,619	42,923,825	44,633,791	+ 1,709,966	+ 233,172
H. Other food	48,578,480	49,307,400	50,991,091	+ 1,683,691	+ 2,412,611
I. Tobacco	16,953,463	17,576,327	18,538,114	+ 961,587	+ 1,584,651
Total, Class I	346,593,011	335,123,189	382,730,461	+27,607,272	+36,137,450
II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED—					
A. Coal	23,404	20,230	32,119	+ 11,889	+ 8,715
B. Other non-metalliferous mining and quarry products and the like	3,238,586	3,727,912	4,304,984	+ 577,072	+ 1,066,398
C. Iron ore and scrap	4,532,243	5,041,631	8,357,639	+ 3,316,008	+ 3,825,396
D. Non-ferrous metalliferous ores and scrap	10,091,344	11,648,688	12,321,952	+ 673,264	+ 2,230,608
E. Wood and timber	39,497,136	35,516,257	43,567,536	+ 8,051,279	+ 4,070,400
F. Raw cotton and cotton waste	36,051,176	37,330,857	45,782,005	+ 8,451,148	+ 9,730,829
G. Wool, raw and waste, and woollen rags	38,205,069	36,755,272	45,657,617	+ 8,902,345	+ 7,452.548
H. Silk, raw, knubs and noils	1,341,412	1,509,741	1,825,651	+ 315,910	+ 484,239
I. Other textile materials	8,496,653	9,809,681	11,242,409	+ 1,432,728	+ 2,745,756
J. Seeds and nuts for oil, oils, fats, resins and gums	21,384,723	25,771,771	28,728,661	+ 2,956,890	+ 7,343,938
K. Hides and skins, undressed	14,739,654	14,657,427	19,519,561	+ 4,862,134	+ 4,779,907
L. Paper-making materials	11,109,620	10,757,385	11,890,355	+ 1,132,970	+ 780,735
M. Rubber	12,026,079	10,142,479	4,398,186	− 5,744,293	− 7,627,893
N. Miscellaneous raw materials and articles mainly unmanufactured	9,254,649	9,591,996	10,541,888	+ 949,892	+ 1,287,239
Total, Class II	209,991,748	212,281,327	248,170,563	+35,889,236	+38,178,815
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—					
A. Coke and manufactured fuel	37,514	45,323	130,593	+ 85,270	+ 93,079
B. Pottery, glass, abrasives, &c.	7,103,126	7,356,877	7,489,050	+ 132,173	+ 385,924
C. Iron and steel and manufactures thereof	9,165,264	8,714,845	11,743,409	+ 3,028,564	+ 2,578,145
D. Non-ferrous metals and manufactures thereof	22,031,589	28,000,118	33,143,160	+ 5,143,042	+11,111,571
E. Cutlery, hardware, implements and instruments	5,755,153	6,202,585	6,863,974	+ 661,389	+ 1,108,821
F. Electrical goods and apparatus	3,065,025	3,089,485	3,676,915	+ 587,430	+ 611,890
G. Machinery	11,294,557	13,225,144	17,973,212	+ 4,748,068	+ 6,678,655
H. Manufactures of wood and timber	5,559,300	6,172,894	7,462,690	+ 1,289,796	+ 1,903,390
I. Cotton yarns and manufactures	2,275,539	2,382,163	2,833,719	+ 451,556	+ 558,180
J. Woollen and worsted yarns and manufactures	2,483,314	2,474,462	3,139,079	+ 664,617	+ 655,765
K. Silk yarns and manufactures	3,072,096	3,027,519	2,563,735	− 463,784	− 508,361
L. Manufactures of other textile materials	7,050,231	6,773,230	7,451,069	+ 677,839	+ 400,838
M. Apparel	8,577,514	8,493,852	9,558,528	+ 1,064,676	+ 981,014
N. Chemicals, drugs, dyes and colours	11,136,756	11,601,484	12,584,235	+ 982,751	+ 1,447,479
O. Oils, fats and resins, manufactured	30,892,054	32,618,059	36,287,252	+ 3,669,193	+ 5,395,198

---

* The value of the Imports represents the cost, insurance and freight; or, when goods are consigned for sale, the latest sale value of such goods.

Values (c.i.f.) of **Imports** *for the years* **1934-35-36**—*Contd.*

(From the Monthly Trade Returns, December, 1936.)

	Year ended December 31,			Increase or Decrease, 1936—1935.	Increase or Decrease, 1936—1934.
	1934.	1935.	1936.		
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—*Contd.*	£	£	£	£	£
P. Leather and manufactures thereof	7,450,806	8,112,835	9,726,711	+ 1,613,876	+ 2,275,905
Q. Paper, cardboard, &c.	13,125,508	13,447,301	14,492,062	+ 1,044,761	+ 1,366,554
R. Vehicles (including locomotives, ships and aircraft...	3,475,093	4,532,917	5,105,264	+ 572,347	+ 1,630,171
S. Rubber manufactures	649,071	564,008	574,346	+ 10,338	− 74,725
T. Miscellaneous articles wholly or mainly manufactured	16,676,434	17,683,391	20,078,430	+ 2,395,039	+ 3,401,996
Total, Class III	170,875,944	184,518,492	212,877,433	+ 28,358,941	+ 42,001,489
IV. ANIMALS, NOT FOR FOOD	1,457,270	1,662,062	1,912,434	+ 250,372	+ 455,164
V. PARCEL POST	2,495,810	2,455,467	3,245,004	+ 789,537	+ 749,194
Total	731,413,783	756,040,537	848,935,895	+ 92,895,358	+ 117,522,112

Values (f.o.b.) of **Exports*** *of Produce and Manufactures of the United Kingdom for the years* **1934–35–36.**

(From the Monthly Trade Returns, December, 1936.)

	Year ended December 31,			Increase or Decrease, 1936—1935.	Increase or Decrease, 1936—1934.
	1934.	1935.	1936.		
I. FOOD, DRINK AND TOBACCO—	£	£	£	£	£
A. Grain and flour	1,784,131	1,831,755	1,807,748	− 24,007	+ 23,617
B. Feeding-stuffs for animals	598,582	573,238	579,197	+ 5,959	− 19,385
C. Animals, living, for food	22,652	6,235	3,269	− 2,966	− 19,383
D. Meat	818,938	922,303	1,060,398	+ 138,095	+ 241,460
E. Dairy produce	881,373	1,075,336	1,304,568	+ 229,232	+ 423,195
F. Fresh fruit and vegetables	314,825	307,689	384,793	+ 77,104	+ 69,968
G. Beverages and cocoa preparations	9,449,534	9,765,988	13,528,415	+ 3,762,427	+ 4,078,881
H. Other food	12,218,631	12,881,865	12,413,802	− 468,063	− 195,171
I. Tobacco	4,366,063	4,214,761	4,504,696	+ 289,935	+ 138,633
Total, Class I	30,454,729	31,579,170	35,586,886	+ 4,007,716	+ 5,132,157
II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED—					
A. Coal	31,854,490	31,558,678	29,311,683	− 2,246,995	− 2,512,807
B. Other non-metalliferous mining and quarry products and the like	1,028,399	1,099,622	1,128,181	+ 28,559	+ 99,782
C. Iron ore and scrap	536,094	452,980	390,763	− 62,217	− 145,331
D. Non-ferrous metalliferous ores and scrap	1,153,597	1,765,548	2,116,632	+ 351,084	+ 963,035
E. Wood and timber	106,324	83,606	90,053	+ 6,447	− 16,271
F. Raw cotton and cotton waste	864,225	1,116,285	850,290	− 265,995	− 13,935
G. Wool, raw and waste, and woollen rags	5,977,857	8,170,592	7,876,675	− 293,917	+ 1,898,818
H. Silk, raw, knubs and noils	57,462	13,461	13,938	+ 477	− 43,524
I. Other textile materials	384,296	400,493	504,956	+ 104,463	+ 120,660
J. Seeds and nuts for oil, oils, fats, resins and gums	1,681,089	3,200,070	3,195,623	− 4,447	+ 1,514,534
K. Hides and skins, undressed	742,649	1,107,204	1,755,040	+ 647,836	+ 1,012,391
L. Paper-making materials	1,124,597	1,095,179	1,251,852	+ 156,673	+ 127,255
M. Rubber	113,906	163,833	194,370	+ 30,537	+ 80,464
N. Miscellaneous raw materials and articles mainly unmanufactured	2,667,267	2,608,360	2,661,229	+ 52,869	− 6,038
Total, Class II	48,292,252	52,835,911	51,341,285	− 1,494,626	+ 3,049,033

---

* The value of the Exports represents the cost and the charges of delivering the goods on board the ship, and is known as the "free on board" value.

Values (f.o.b.) of **Exports** *for the years* **1934–35–36**—*Contd.*

(From the Monthly Trade Returns, December, 1936.)

	Year ended December 31,			Increase or Decrease, 1936—1935.	Increase or Decrease, 1936—1934.
	1934.	1935.	1936.		
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—	£	£	£	£	£
A. Coke and manufactured fuel...	2,748,103	3,019,143	2,992,322	− 26,821	+ 244,219
B. Pottery, glass, abrasives, &c.	7,750,982	8,309,037	8,667,933	+ 358,896	+ 916,951
C. Iron and steel and manufactures thereof	34,526,113	35,958,498	35,998,581	+ 40,083	+ 1,472,468
D. Non-ferrous metals and manufactures thereof	11,889,802	14,076,230	12,149,809	− 1,926,421	+ 260,007
E. Cutlery, hardware, implements and instruments	7,406,883	8,122,184	8,169,408	+ 47,224	+ 762,525
F. Electrical goods and apparatus	8,033,231	9,541,155	10,030,553	+ 489,398	+ 1,997,322
G. Machinery	33,593,132	39,352,247	41,183,228	+ 1,830,981	+ 7,590,096
H. Manufactures of wood and timber	1,048,149	1,062,328	1,216,547	+ 154,219	+ 168,398
I. Cotton yarns and manufactures........................	59,095,689	60,170,799	61,518,242	+ 1,347,143	+ 2,422,553
J. Woollen and worsted yarns and manufactures	28,848,552	30,366,794	32,218,785	+ 1,851,991	+ 3,370,233
K. Silk yarns and manufactures	1,058,073	1,142,389	1,264,150	+ 121,761	+ 206,077
L. Manufactures of other textile materials	15,607,248	15,732,296	17,299,728	+ 1,567,432	+ 1,692,480
M. Apparel...........................	11,085,167	11,065,717	11,870,235	+ 804,518	+ 785,068
N. Chemicals, drugs, dyes and colours	20,608,695	21,328,503	21,099,090	− 229,413	+ 490,395
O. Oils, fats and resins, manufactured	4,915,565	5,160,743	4,912,697	− 248,046	− 2,868
P. Leather and manufactures thereof	3,158,410	3,791,769	4,269,814	+ 478,045	+ 1,111,404
Q. Paper, cardboard, &c.	6,276,112	6,579,899	6,731,212	+ 151,313	+ 455,100
R. Vehicles (including locomotives, ships and aircraft)	24,708,095	29,485,832	32,288,799	+ 2,802,967	+ 7,580,704
S. Rubber manufactures............	1,576,382	1,512,141	1,569,262	+ 57,121	− 7,120
T. Miscellaneous articles wholly or mainly manufactured	20,871,229	23,039,459	25,465,715	+ 2,426,256	+ 4,594,486
Total, Class III	304,805,612	328,817,163	340,916,110	+12,098,947	+36,110,498
IV. ANIMALS, NOT FOR FOOD	628,615	673,863	1,032,576	+ 358,713	+ 403,961
V. PARCEL POST	11,804,313	11,928,321	11,841,927	− 86,394	+ 37,614
Total............................	395,983,521	425,834,428	440,718,784	+14,884,356	+44,733,263

Values (f.o.b.) of* **Exports of Imported Merchandise** *for the years* **1934–35–36.**

(From the Monthly Trade Returns, December, 1936.)

	Year ended December 31,			Increase or Decrease, 1936—1935.	Increase or Decrease, 1936—1934.
	1934.	1935.	1936.		
I. FOOD, DRINK AND TOBACCO—	£	£	£	£	£
A. Grain and flour	963,351	780,250	804,712	+ 24,462	− 158,639
B. Feeding-stuffs for animals	82,754	59,748	38,050	− 21,698	− 44,701
C. Animals, living, for food	—	—	—	—	—
D. Meat	747,282	813,274	634,499	− 178,775	− 112,783
E. Dairy produce......................	556,804	777,870	654,052	− 123,818	+ 97,248
F. Fresh fruit and vegetables......	1,238,478	1,270,437	1,280,277	+ 9,840	+ 41,799
G. Beverages and cocoa preparations	6,777,279	6,449,028	6,198,551	− 250,477	− 578,728
H. Other food	1,058,673	1,545,119	1,181,834	− 363,285	+ 123,161
I. Tobacco	1,213,893	859,819	888,420	+ 28,601	− 325,473
Total, Class I	12,638,514	12,555,545	11,680,395	− 875,150	− 958,119

* The value of the Exports represents the cost and the charges of delivering the goods on board the ship, and is known as the "free on board" value.

Values (f.o.b.) of **Exports of Imported Merchandise** *for the years* **1934–35–36**—*Contd.*

(From the Monthly Trade Returns, December, 1936.)

	Year ended December 31,			Increase or Decrease, 1936—1935.	Increase or Decrease, 1936—1934.
	1934.	1935.	1936.		
II. RAW MATERIALS AND ARTICLES MAINLY UNMANUFACTURED—	£	£	£	£	£
A. Coal	—	—	—	—	—
B. Other non-metalliferous mining and quarry products and the like	276,155	217,812	252,158	+ 34,346	− 23,997
C. Iron ore and scrap	1,253	1,562	642	− 920	− 611
D. Non-ferrous metalliferous ores and scrap	250,474	412,682	295,176	− 117,506	+ 44,702
E. Wood and timber	222,154	281,966	257,375	− 24,591	+ 35,221
F. Raw cotton and cotton waste	2,056,196	2,360,995	1 957,627	− 403,368	− 98,569
G. Wool, raw and waste, and woollen rags	12,646,541	11,578,968	13,176,686	+ 1,597,718	+ 530,145
H. Silk, raw, knubs and noils	50,879	9,557	5,048	− 4,509	− 45,831
I. Other textile materials	433,468	591,589	484,416	− 107,173	+ 50,948
J. Seeds and nuts for oil, oils, fats, resins and gums	523,743	1,248,847	721,699	− 527,148	+ 197,956
K. Hides and skins, undressed	6,971,998	8,279,600	9,437,486	+ 1,157,886	+ 2,465,488
L. Paper-making materials	37,184	40,363	61,467	+ 21,104	+ 24,283
M. Rubber	3,189,952	2,858,530	4,918,750	+ 2,060,220	+ 1,728,798
N. Miscellaneous raw materials and articles mainly unmanufactured	1,161,638	1,249,634	1,393,291	+ 143,657	+ 231,653
Total, Class II	27,821,635	29,132,105	32,961,821	+ 3,829,716	+ 5,140,186
III. ARTICLES WHOLLY OR MAINLY MANUFACTURED—					
A. Coke and manufactured fuel	177	147	254	+ 107	+ 77
B. Pottery, glass, abrasives, &c.	61,207	59,902	65,376	+ 5,474	+ 4,169
C. Iron and steel and manufactures thereof	61,496	80,176	266,272	+ 186,096	+ 204,776
D. Non-ferrous metals and manufactures thereof	1,293,092	4,030,876	5,742,708	+ 1,711,832	+ 4,449,616
E. Cutlery, hardware, implements and instruments	715,780	723,223	737,053	+ 13,830	+ 21,273
F. Electrical goods and apparatus	94,686	83,381	94,247	+ 10,866	− 439
G. Machinery	829,805	851,044	891,001	+ 39,357	+ 61,196
H. Manufactures of wood and timber	143,171	162,625	169,952	+ 7,327	+ 26,781
I. Cotton yarns and manufactures	127,598	143,963	184,582	+ 40,619	+ 56,984
J. Woollen and worsted yarns and manufactures	593,324	522,345	613,397	+ 91 052	+ 20,073
K. Silk yarns and manufactures	277,643	289,180	199,240	− 89,940	− 78,403
L. Manufactures of other textile materials	581,238	544,009	488,469	− 55,540	− 92,769
M. Apparel	592,548	549,056	529,296	− 19,760	− 63,252
N. Chemicals, drugs, dyes and colours	674,246	400,701	403,676	+ 2,975	− 270,570
O. Oils, fats and resins, manufactured	1,533,870	1,706,022	1,811,535	+ 105,513	+ 277,665
P. Leather and manufactures thereof	918,612	1,048,597	1,072,018	+ 23,421	+ 153,406
Q. Paper, cardboard, &c.	45,209	63,484	67,753	+ 4,269	+ 22,544
R. Vehicles (including locomotives, ships and aircraft)	142,832	143,964	167,780	+ 23,816	+ 24,948
S. Rubber manufactures	29,805	20,481	14,688	− 5,793	− 15,117
T. Miscellaneous articles wholly or mainly manufactured	1,760,059	1,912,560	1,930,307	+ 17,747	+ 170,248
Total, Class III	10,476,398	13,336,336	15,449,604	+ 2,113,268	+ 4,973,206
IV. ANIMALS NOT FOR FOOD	306,800	278,633	324,541	+ 45,908	+ 17,741
Total	51,243,347	55,302,619	60,416,361	+ 5,113,742	+ 9,173,014

BANK OF ENGLAND.

Pursuant to the Act 7th and 8th Victoria, cap. 32 (1844),

(000's omitted.)

1	2	3	4	5	6	7	8
ISSUE DEPARTMENT.						COLLATERAL COLUMNS.	
Liabilities.	Dates. (Wednesdays.)	Assets.					
Notes Issued.		Govt. Debt (£11,015) and Govt. Securities.	Other Securities.	Gold Coin and Bullion.	Silver Coin.	Notes in Hands of Public.	Minimum Discount Rate.
£		£	£	£	£	£	Per cent.
460,161	Jan. 8	257,465	1,435	200,161	1,100	405,558	2
460,161	,, 15	257,493	1,397	200,161	1,110	397,722	
460,246	,, 22	256,853	2,049	200,246	1,098	394,919	
460,469	,, 29	256,957	1,943	200,469	1,100	397,138	
460,528	Feb. 5	256,725	2,172	200,528	1,103	399,833	
460,528	,, 12	255,920	2,976	200,528	1,104	399,281	
460,611	,, 19	256,661	2,249	200,611	1,090	396,884	
460,612	,, 26	256,769	2,147	200,612	1,084	399,882	
460,613	Mar. 4	255,888	3,027	200,613	1,085	404,029	
460,613	,, 11	257,177	1,781	200,613	1,042	404,537	
460,613	,, 18	257,308	1,648	200,613	1,044	404,368	
460,615	,, 25	257,505	1,493	200,615	1,002	406,494	
460,850	Apr. 1	258,106	917	200,850	977	413,018	
461,150	,, 8	258,623	401	201,150	976	421,416	
461,630	,, 15	258,618	402	201,630	980	421,891	
462,144	,, 22	258,619	410	202,144	971	415,448	
462,734	,, 29	258,701	404	202,734	895	416,876	
463,660	May 6	258,719	386	203,660	895	422,641	
464,291	,, 13	258,781	349	204,291	870	424,790	
465,363	,, 20	258,828	304	205,363	868	423,130	
466,397	,, 27	258,918	261	206,397	821	426,062	
467,282	June 3	258,978	226	207,282	796	433,453	
468,497	,, 10	258,996	239	208,497	765	433,004	
471,859	,, 17	259,179	57	211,859	764	432,021	
476,326	,, 24	259,139	96	216,326	765	434,789	
481,112	July 1	259,142	96	221,112	762	439,642	
485,601	,, 8	259,194	71	225,601	735	443,106	
490,994	,, 15	258,986	278	230,994	736	443,259	
495,767	,, 22	258,752	548	235,767	700	443,595	
499,941	,, 29	258,062	1,308	239,941	630	448,571	
502,960	Aug. 5	257,066	2,350	242,960	584	454,406	
502,960	,, 12	257,330	2,137	242,960	533	450,285	
503,789	,, 19	256,999	2,515	243,789	486	444,540	
504,755	,, 26	256,863	2,681	244,755	456	443,409	
505,403	Sept. 2	257,358	2,245	245,403	397	445,784	
506,524	,, 9	258,646	957	246,524	397	445,591	
506,843	,, 16	259,209	393	246,843	398	444,862	
507,601	,, 23	259,188	467	247,601	345	445,104	
508,650	,, 30	259,383	300	248,650	317	449,396	
508,660	Oct. 7	259,403	332	248,660	265	450,842	
508,660	,, 14	258,168	1,618	248,660	214	446,367	
508,660	,, 21	257,247	2,619	248,660	134	440,100	
508,660	,, 28	256,953	3,011	248,660	36	442,741	
508,660	Nov. 4	257,560	2,419	248,660	21	447,112	
508,660	,, 11	258,119	1,826	248,660	55	446,622	
508,860	,, 18	258,158	1,833	248,660	9	444,905	
308,660	,, 25	258,161	1,830	248,660	9	445,567	
508,660	Dec. 2	258,684	1,303	248,660	13	451,587	
508,660	,, 9	259,679	306	248,660	15	458,852	
513,661	,, 16	199,715	274	313,661	11	467,695	
513,661	,, 23	199,789	199	313,661	12	474,116	
513,661	,, 30	199,852	136	313,661	12	467,406	

WEEKLY RETURN.

for Wednesday in each Week, during the Year **1936.**

(000's omitted.)

9	10	11	12	13	14	15	16	17	18
BANKING DEPARTMENT.									
Liabilities.				DATES.	Assets.				Totals of Liabilities and Assets.
Capital (£14,553) and Rest.	Public Deposits.	Banker's Deposits.	Other Deposits.	(Wednesdays.)	Govt. Securities.	Discounts and Advances.	Other Securities.	Reserve (Notes and Coin).	
£	£	£	£		£	£	£	£	£
18,083	11,260	107,833	36,792	Jan. 8	84,390	21,260	13,058	55,260	173,968
18,101	13,816	110,105	37,539	,, 15	83,890	20,029	12,527	63,115	179,561
18,134	13,075	118,867	36,374	,, 22	86,680	19,280	14,511	65,979	186,450
18,150	15,851	106,040	36,723	,, 29	80,045	18,753	13,988	63,978	176,764
18,174	10,989	102,877	37,025	Feb. 5	79,415	14,440	13,855	61,355	169,065
18,192	10,981	103,627	36,302	,, 12	79,190	13,408	14,564	61,940	169,102
18,217	11,080	107,630	35,973	,, 19	78,720	11,653	18,099	64,428	172,900
18,237	8,823	106,190	35,457	,, 26	82,105	10,990	14,128	61,475	168,707
18,256	7,931	104,522	36,639	Mar. 4	83,440	11,922	14,663	57,323	167,348
18,264	14,238	91,570	36,064	,, 11	78,580	9,945	14,791	56,820	160,136
18,283	16,891	90,849	37,203	,, 18	80,160	8,606	17,463	56,997	163,226
18,302	18,000	83,618	36,959	,, 25	80,305	4,963	16,711	54,900	156,879
18,329	9,736	102,648	38,469	Apr. 1	95,875	10,108	14,583	48,616	169,182
17,674	9,605	93,440	37,142	,, 8	93,862	9,773	13,692	40,534	157,861
17,695	9,904	104,911	36,569	,, 15	106.672	8,756	13,162	40,489	169,079
17,706	13,231	93,081	38,053	,, 22	93,250	7,479	13,889	47,453	162,071
17,717	7,453	104,705	39,032	,, 29	101,330	8,290	12,641	46,646	168,907
17,737	9,181	88,342	36,657	May 6	88,798	9,448	11,852	41,819	151,917
17,740	13,331	83,214	37,003	,, 13	89,883	8,826	12,266	40,313	151,288
17,755	21,027	80,082	36,764	,, 20	91,173	7,143	14,254	43,058	155,628
17,803	19,767	78,275	36,733	,, 27	91,758	6,695	12,923	41,202	152,578
17,823	8,217	89,719	37,096	June 3	98,543	6,243	13,351	34,718	152,855
17,858	13,481	86,500	37,063	,, 10	97,768	6,166	14,571	36,397	154,902
17,896	13,950	90,996	37,360	,, 17	98,278	4,811	16,332	40,781	160,202
17,943	20,047	90,822	37,373	,, 24	99,603	7,641	16,454	42,487	166,185
17,994	9,910	111,707	39,766	July 1	110,403	10,626	15,920	42,428	179,377
18,048	10,521	96,704	38,366	,, 8	96,758	5,983	17,436	43,462	163,639
18,067	20,392	90,637	40,684	,, 15	96,813	5,864	18,407	48,696	169,780
18,108	19,935	98,213	38,468	,, 22	95,774	6,461	19,358	53,131	174,724
18,124	42,292	75,223	39,371	,, 29	96,408	7,138	19,086	52,378	175,010
18,159	17,606	92,668	38,518	Aug. 5	89,943	8,938	18,472	49,598	166,951
18,180	17,418	97,990	37,981	,, 12	89,613	8,939	19,290	53,727	171,569
18,204	23,562	95,966	39,958	,, 19	86,408	9,678	21,282	60,322	177,690
18,228	17,230	100,911	37,840	,, 26	84,758	9,202	17,814	62,435	174,209
18,247	18,053	101,068	38,762	Sept. 2	85,709	10,621	19,086	60,714	176,130
18,249	20,361	99,828	37,768	,, 9	83,503	10,549	20,126	62,028	176,206
18,246	14,842	102,183	38,659	,, 16	81,598	9,184	20,069	63,079	173,930
18,265	10,442	107,982	38,795	,, 23	83,663	7,881	20,338	63,602	175,484
18,291	49,714	60,719	40,949	,, 30	80,323	8,589	20,402	60,359	169,673
17,637	24,752	84,192	40,941	Oct. 7	79,758	9,291	19,569	58,909	167,522
17,661	31,616	82,156	41,231	,, 14	80,368	9,553	19,377	63,366	172,664
17,681	37,598	81,425	41,112	,, 21	79,943	6,744	21,552	69,577	177,816
17,291	27,608	86,533	41,369	,, 28	80,183	6,601	19,503	66,914	173,201
17,729	27,201	85,340	41,809	Nov. 4	81,963	7,655	19,969	62,492	172,079
17,755	14,916	98,041	41,587	,, 11	80,433	8,628	20,286	62,952	172,299
17,780	14,116	96,083	44,675	,, 18	78,973	7,395	21,686	64,600	172,654
17,817	12,056	97,604	41,694	,, 25	78,160	6,803	20,408	63,800	169,171
17,866	10,561	99,120	41,108	Dec. 2	82,433	8,462	20,176	57,584	168,655
17,892	17,491	86,985	38,884	,, 9	81,718	8,146	20,925	50,463	161,252
17,902	10,427	96,151	38,757	,, 16	89,088	6,743	20,761	46,645	163,237
17,975	21,734	72,220	38,768	,, 23	83,121	6,448	20,966	40,162	150,697
18,005	12,135	150,580	39,191	,, 30	134,481	17,467	21,157	46,806	219,911

FOREIGN EXCHANGES.—*Quotations as under,* LONDON *on Paris, Berlin and Calcutta; New York and Hong Kong on* LONDON, **1936.**

	1	2	3	4	5	6	7
						Price per Ounce.	
DATE. (Thursdays)	London on Paris. Cables (middle rate).	London on Berlin. Cables (middle rate).	London on Calcutta. Demand (middle rate).	New York on London. Cables (closing rate).	Hong Kong on London. T.T.	Gold Bars (fine).	Silver Standard Bars (cash).
1936.	*f. c.*	*Reichmarks.*	*s. d.*	*$ c.*	*s. d.*	*s. d.*	*s. d.*
Jan. 2......	74·$\frac{57}{64}$	12·24$\frac{1}{2}$	1·6$\frac{3}{32}$	4·92$\frac{7}{8}$	1·3$\frac{1}{4}$	141·4	1·10$\frac{3}{8}$
„ 16......	74·$\frac{61}{64}$	12·27$\frac{1}{2}$	„	4·95$\frac{3}{4}$	1·3$\frac{3}{4}$	140·10	1·7$\frac{7}{8}$
„ 30......	75·$\frac{1}{64}$	12·30$\frac{1}{2}$	„	5·00$\frac{5}{8}$	1·3$\frac{13}{16}$	140·8	1·7$\frac{5}{16}$
Feb. 13......	74·$\frac{57}{64}$	12·29$\frac{1}{2}$	„	4·98$\frac{3}{4}$	1·3$\frac{15}{16}$	140·10$\frac{1}{2}$	1·7$\frac{7}{8}$
„ 27......	74·$\frac{3}{4}$	12·28$\frac{1}{2}$	„	4·99$\frac{1}{8}$	1·3$\frac{13}{16}$	141·0$\frac{1}{2}$	1·7$\frac{3}{4}$
Mar. 12......	74·$\frac{37}{64}$	12·28	„	4·97$\frac{5}{8}$	1·3$\frac{3}{4}$	141·1	1·7$\frac{3}{4}$
„ 26......	75·0	12·30$\frac{1}{2}$	„	4·95$\frac{3}{4}$	1·3$\frac{11}{16}$	140·10$\frac{1}{2}$	1·8
Apr. 9......	74·$\frac{1}{2}$	12·27$\frac{1}{2}$	„	4·94$\frac{1}{4}$	1·3$\frac{11}{16}$	140·10$\frac{1}{2}$	1·8$\frac{1}{16}$
„ 23......	74·$\frac{35}{64}$	12·27$\frac{1}{2}$	„	4·93$\frac{3}{8}$	1·3$\frac{11}{16}$	141·0$\frac{1}{2}$	1·8$\frac{3}{8}$
May 7......	74·$\frac{21}{64}$	12·29$\frac{1}{2}$	„	4·97$\frac{1}{16}$	1·3$\frac{13}{16}$	140·8$\frac{1}{2}$	1·8$\frac{1}{4}$
„ 21......	74·$\frac{31}{64}$	12·34	„	4·97$\frac{1}{32}$	1·3$\frac{19}{32}$	139·11$\frac{1}{2}$	1·8$\frac{1}{16}$
June 4......	74·$\frac{13}{32}$	12·49	„	5·01$\frac{1}{32}$	1·3$\frac{5}{16}$	138·3$\frac{1}{2}$	1·7$\frac{13}{16}$
„ 18......	76·$\frac{17}{32}$	12·50	„	5·03$\frac{1}{32}$	1·3$\frac{3}{8}$	138·7	1·7$\frac{5}{8}$
July 2......	75·$\frac{47}{64}$	12·43$\frac{1}{2}$	„	5·02$\frac{7}{32}$	1·3$\frac{7}{16}$	139·1	1·7$\frac{1}{2}$
„ 16......	75·[illegible]	12·46	„	5·02$\frac{9}{32}$	1·3$\frac{7}{16}$	138·11	1·7$\frac{11}{16}$
„ 30......	75·[illegible]	12·46$\frac{1}{2}$	„	5·01$\frac{31}{32}$	1·3$\frac{5}{16}$	138·10	1·7$\frac{7}{16}$
Aug. 13......	76·$\frac{11}{32}$	12·49$\frac{1}{2}$	„	5·02$\frac{27}{32}$	1·2$\frac{7}{8}$	138·4	1·7$\frac{5}{16}$
„ 27......	76·$\frac{35}{64}$	12·51	„	5·03$\frac{1}{2}$	1·2$\frac{13}{16}$	138·2$\frac{1}{2}$	1·7$\frac{5}{16}$
Sept. 10......	76·$\frac{13}{16}$	12·58$\frac{1}{2}$	„	5·05$\frac{11}{32}$	1·2$\frac{3}{4}$	137·7$\frac{1}{2}$	1·7$\frac{1}{2}$
„ 24......	76·$\frac{27}{32}$	12·60	„	5·05$\frac{5}{32}$	1·2$\frac{7}{8}$	137·3	1·7$\frac{7}{16}$
Oct. 8......	104·[illegible]	12·16$\frac{1}{2}$	„	4·8[illegible]	1·2$\frac{13}{16}$	142·3	1·8$\frac{1}{8}$
„ 22......	105·$\frac{3}{16}$	12·16$\frac{1}{2}$	„	4·89$\frac{5}{32}$	1·2$\frac{29}{32}$	142·1	1·7$\frac{7}{8}$
Nov. 5......	105·$\frac{7}{32}$	12·14	„	4·88$\frac{1}{8}$	1·2$\frac{15}{16}$	143·3	1·8$\frac{3}{16}$
„ 19......	105·$\frac{11}{64}$	12·15$\frac{1}{2}$	„	4·88$\frac{11}{32}$	1·2$\frac{15}{16}$	142·2$\frac{1}{2}$	1·9
Dec. 3......	105·[illegible]	12·18$\frac{1}{2}$	„	4·90$\frac{17}{32}$	1·2$\frac{15}{16}$	141·9$\frac{1}{2}$	1·9$\frac{1}{4}$
„ 17......	105·[illegible]	12·21$\frac{1}{2}$	„	4·91$\frac{17}{32}$	1·2$\frac{15}{16}$	141·5$\frac{1}{2}$	1·9$\frac{5}{16}$
„ 31......	105·[illegible]	12·20	1·6$\frac{1}{16}$	4·91$\frac{5}{32}$	1·3	141·7	1·9$\frac{5}{16}$

Vol. C.] [Part II.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY

PART II, 1937.

THE DEMOGRAPHY OF BRITISH COLONIAL POSSESSIONS.

A NOTE ON THE ASSEMBLY AND INTERPRETATION OF DATA.

By P. GRANVILLE EDGE.

Lecturer in the Division of Epidemiology and Medical Statistics, London School of Hygiene and Tropical Medicine (University of London).

[Read before the ROYAL STATISTICAL SOCIETY, January 19th, 1937, the President, the RT. HON. LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C., in the Chair.]

ABOUT the middle of the nineteenth century, and according to published records for the first time in the history of this Society, a paper was contributed discussing the Colonial Dependencies of the United Kingdom.* During the next 87 years Colonial affairs were the subject of discussion at our monthly meetings on six occasions only,† the last occasion being as far back as 37 years ago, when Sir Alfred Flux read a paper entitled "The Flag and Trade. A Summary Review of the Chief Colonial Empires." ‡

During nearly a century of time, therefore, perhaps a dozen or at most a score of hours have been devoted to meetings when our Colonial Possessions was the subject tabled for discussion, and in the light of this evidence it is not unreasonable to assume that a further consideration of these important matters is long overdue. No comparisons between present-day conditions and those discussed in earlier papers will be attempted. Prior to 1925, the term "Colonial Possessions" was held to embrace *all* overseas territories under the British Flag, but in July of that year a new Secretaryship of State for Dominion Affairs was created to take over from the

---

* "Some Particulars of the Commercial Progress of the Colonial Dependencies of the United Kingdom during the Twenty Years, 1827–1846," by J. T. Danson, *Jour. Roy. Stat. Soc.*, Vol. XII, 1849, pp. 349–439.

† See *Jour. Roy. Stat. Soc.*, Vols. XXV, 1862; XXVIII, 1864; XXXV, 1872; XLVII, 1884; LVIII, 1895; and LXII, 1899.

‡ *Jour. Roy. Stat. Soc.*, Vol. LXII, June 1899, pp. 489–562.

Colonial Office business connected with the self-governing Dominions, while in 1930 Dominion affairs became the entire and separate charge of a principal Secretary of State.* Furthermore, earlier papers were mainly concerned with discussion of the commercial aspects of those territories, whereas the scope of the present essay will be limited to a brief survey of the human inhabitants of the non-self-governing Colonies, Protectorates, and Mandated Territories, excluding entirely any reference to the self-governing Dominions.

Nowadays, Dominions affairs are accorded such prominence in the columns of our daily newspapers that most of us have at least a nodding acquaintance with some of the intimate features characterizing those areas. On the other hand, it would scarcely be an exaggeration to say that the majority of English people of the present day have but the vaguest notions of the extent and resources of the Colonial Empire, which comprises upwards of 50 distinct Governments, has territories extending over an area exceeding two million square miles, and whose total population of upwards of 58 millions of people † is not only double the combined populations of Canada, Australia, New Zealand, and South Africa, but also embraces a bewildering medley of races, religions, languages, and customs.

This brief introduction is designed to explain one reason for the submission of the present essay. If further excuse is demanded, it may be pleaded that since Colonial affairs have recently acquired a prominent news value by virtue of the interest which certain nations have displayed in the acquisition of overseas possessions, attention might be focussed, on at least one occasion during the present Session of the Society, on that significant heritage defined as the British Colonial Empire. And finally attention might be directed towards the not uncommon tendency observed among many demographers to under-estimate the value of data, on grounds that they lack the fundamental attribute of uniform reliability. Critics of this school invariably conclude that reforms of organization and method are always easy of accomplishment in any country remote from their own. To them the limitations of work in distant parts of the world appear vague and unreal, and, as a natural consequence, the ease with which reformative schemes can be implemented must seem to them to increase with distance. Such workers are invited to ponder over the references to limitations imposed by local conditions in the pages which follow, in the hope that they may be induced to regard more appreciatively the labours of their colleagues in the Colonial field. On the present occasion an attempt will be made to summarize briefly some of the more outstanding medico-statistical details recorded, and the difficulties encountered by Colonial Medical Officers who are engaged in the promotion of the physical well-being of a variety of peoples whose outlook and standards of life differ so widely from European experience, and who are to be found inhabiting units of varying size and importance in every corner of the globe.

---

* *Dominions and Colonial Office List*, pp. viii and lxxxix *et seq.*, 1935 Edition.

† The list of territories in the appended Table I is incomplete. No Medical Reports were received from St. Helena, Ascension, the State of North Borneo, Sarawak, Tonga, etc.

As an aid to the orientation of the territorial entities to which reference will be made, the British Colonial Possessions * are regarded as falling naturally into five main geographical groups comprising: (*a*) the Mediterranean and Near East, (*b*) the Far East, (*c*) the Western Pacific, (*d*) British Tropical Africa, and (*e*) the West Indies and the Atlantic.† The fundamental demographic facts relating to these territories have been extracted mainly from Colonial Medical Reports for the year 1934 (the most recent information available for present purposes for a complete year), and are set out in Table I.‡

It should be pointed out that these annual studies not only provide the principal vital statistical facts for each territory; such details represent but a minor section within the covers of each of these reports which discuss a bewildering series of sanitary experiences as varied as the contents of the witches' cauldron in *Macbeth*, and a complex variety of conditions of climate, food, physique, custom and other factors influencing the lives of millions of people comprising races ranging from the semi-primitive to the civilized, and inhabiting territories lying between the Falkland Islands at the toe of South America and Hong Kong in the China Seas, and from Gibraltar to the remote South Pacific.§

From examination of the data in the first two columns of the table, it may be observed that over nine-tenths of the total area and total population of the Colonies lie wholly within the Tropics, with British Tropical Africa accounting for more than two-thirds of the total population, and over three-fourths of the recorded area. This tropical distribution of the Colonial population demands especial consideration, for unless it is realized that the cultures represented in the tropical belt differ utterly from those of Europe, and study of this section of Colonial demography is undertaken with a full appreciation of the disparities, the investigator is apt to misinterpret the real significance of the facts.

---

* By this is meant non-self-governing Colonies, Protectorates, Mandated Territories.

† See *The Colonial Service*, by Sir A. Bertram. Cambridge, 1930.

‡ These data may be at variance with corresponding data appearing in other published documents.

§ *The Contents of Colonial Medical Reports.* A Note by P. Granville Edge, pp. 3–6, *Tropical Diseases Bull. Supp.* 1936.

For example, the majority of the four-million-odd people of British Malaya are not Malays; the latter are outnumbered in that territory by the Chinese, while additionally there is to be found one Indian resident to every three Malays. Still further it may be noted that in the Straits Settlements the Chinese outnumber the Malays by more than two to one, in the Federated Malay States they still have a slight numerical superiority, but in the Unfederated Malay States the Malays outnumber the Chinese by about three to one. On the other hand, the bulk of the people in British Tropical Africa are native-born Africans belonging to one or other of different tribal groups, among whom are to be found giant negroes, light-skinned pigmies, and other types as racially different as Englishmen and Hottentots, together with a proportionately small, though numerically considerable, number of Indians, Arabs, Goans, and representatives of other races. Turning to the other side of the world, it may be noted that no traces of the aboriginal Carib inhabitants of the islands comprising the British West Indian Colonies now survive, the present-day population being composed of the descendants of African slaves, East Indians, Europeans, and inter-racial mixtures.

When we turn to consideration of the figures relating to density of population, the emptiness of some parts of the Colonial Empire seems to present itself as a problem of first-rate political importance. Over the whole of these Colonial territories the average density is less than 30 persons to the square mile; the extreme range extends from the exceptionally low figure of 0·5 in the Falkland Islands to a density of 7,900 in Gibraltar and over 2,400 in Hong Kong, while between these limits lie a number of areas of low population density where possibly neither soil nor climate seems to justify this anomaly. Since in some European countries a square mile must support 400 people or more, certain of our apparently neglected Colonial areas have become a focus of attention, and some foreign Governments may incline to the view that we hold our great heritage in a nerveless grasp, and that they could more successfully exploit the resources we appear to neglect.

Discussion of the *pros* and *cons* of these and other aspects of this side of the problem lie outside the scope of the present essay, but it is submitted that raw figures alone will not suffice to explain some of these problems of human occupation in distant places, and the following examples may serve to demonstrate this.

Five of the eight areas in the Far Eastern Group appear to be reasonably well populated, and of the remaining three it may be said the density indices as they stand are apt to be misleading.

For example, the central portion of the *Federated Malay States* is mountainous, and largely covered with tropical forest; certain large areas are reserved exclusively to Malays, and such lands may not be alienated to any non-Malay person. Population densities per square mile in Selangor, Perak, and Negri Sembilan read 168·7, 96·9, and 91·4 respectively. Population densities may vary widely even within the boundaries of individual States. For example, the District of Kinta in the State of Perak has an average density figure of 358, but approximately half the total area is unpopulated by virtue of unsuitable physical conditions, and over the remainder of the territory population density is in the neighbourhood of 700 to the square mile. It is only Pahang, lying to the east of the central mountain range, the largest of the four States in the Federation, and less highly developed by reason of the hilly nature of the country, that is sparsely populated. Taking the Federated Malay States as a whole, it may be noted that during the decennium 1921–31 the population increased by approximately 30 per cent.

So far as the *Unfederated Malay States* are concerned, Perlis, the most northerly of the Malay States, has a density figure of 166·8. South of Perlis lies Kedah, with a density of 127·5 persons to the square mile; the eastern area of this State bordering Siam is still largely undeveloped. The Kelantan density figure reads 67·6, but in this State only about one-fifth of the area is fertile cultivable plain, and as such densely populated—over 500 to the square mile in most parts—the remainder of the country being hilly and covered with forest and virgin jungle. Moreover, Kelantan enjoys the distinction of possessing a larger Malay population than any other State in the Peninsula. And finally there is the State of Johore, with an area approximately that of Wales, yet having only three or four towns of any size (among them the capital, accounting for one-fifth of the total population) and an average of 66·6 persons to the square mile over the whole of the State. However, though Johore is less mountainous than any other State in the Peninsula, the greater part of the interior consists of equatorial forest and jungle country; over 11 per cent. of the total area of the State has been constituted Forest Reserves.

In the *Pacific Group*, the low-population density figure for Fiji is largely due to the fact that three-sevenths of the total area of the Colony is mountainous forest country, and scarcely suited to human settlement; another two-sevenths are less mountainous, but said to be suited to cattle-raising. If these areas are excluded and the really habitable remainder related to the population, the density figure is increased four-fold. In the British Solomon Islands also, a great part of the total area is practically uninhabited, and perhaps uninhabitable by reason of the limitations imposed by heavy tropical forest, dense bush, and broken mountainous tracts characterizing the surface features of these islands. Furthermore, it is to be remembered that as the produce of cocoanuts in the form of copra is the only commercial crop exploited of any value (about 80 per cent. of total exports value), and that no other form of industry of any significance exists in the Protectorate, the usual inducements for the attraction and maintenance of a numerous population are lacking.

In *British Guiana*, the only British Colony on the mainland of South America, with an area nearly twice that of England and Wales, the density rate is returned as 3·6 to the square mile. In this territory, however, the permanent settlement of people has been possible only along a narrow coastal strip between the sea and the undrained swamps bordering the central area of tropical forest.*

British Honduras, a narrow strip of country some 68 miles wide, lying along the coast of Central America, has a density figure of 6·4 to the square mile. Here the lands along the coast are flat and swampy, but rising towards the interior, and especially towards the south, into a broken succession of valleys and hills. Belize, the capital, and the only town of any size, accounts for approximately one-third of the total population of the Colony.† Roads are, for all practical purposes, non-existent except near the towns, and difficulties of transportation between the interior and the coast have, so far, proved an obstacle to settlement and development.

On the other hand, Bermuda, another West Indian Colony, has a density of 1,628 to the square mile. But here we have an agglomeration of romantically attractive coral islands blessed with an unusually genial climate, the combination serving to make the colony so popular as a tourist centre that catering for visitors is the most important economic activity, with tourist expenditure forming about 80 per cent. of the Colony's total revenue.

Passing to East Africa, Kenya's low average density of 13·8 is apt to prove misleading, unless it is remembered that three-fifths of the territory is northern desert area, comparatively waterless, and in consequence very sparsely populated; another fifth is set aside as Native Reserves, while upwards of 4,000 square miles constitute Forest Reserves. If these areas are excluded population density over the remainder—mainly the southern strip of country in which the bulk of economic production centres—is increased nearly six-fold. That a notable degree of maldistribution of population exists in Kenya may be gathered from noting how population densities vary in the different Native Reserves. In the Kikuyu Reserve the density is 283 to the square mile, but in the adjacent Masai Reserve to the south average density falls to 3 to the square mile. On the other hand, the Wakamba live alongside the Masai in territory where the soil is on the whole poorer, yet their density figure reads 48 to the square mile, while among the neighbouring Kavirondo the figure rises to 145.* In Nyasaland, also in East Africa, the density figure is 33·4, which becomes 42·5 if population is related to land area only, for of the total area of the territory, approximately 10,353 square miles are water. Still further, it has been observed "the figure varies considerably in different parts of the Protectorate, the numbers ranging from 6·8 to 174·6 per square mile in the Northern Province and from 13·9 to 556 per square mile in the Southern Province." † But the average density figure here masks a significant characteristic of Nyasaland's population, viz., its composition. In recent years, the exodus of males between the ages of 18 and 45 has assumed such proportions that it is estimated 60 per cent. of the able-bodied men are absent from the Protectorate, the majority permanently, with the inevitable consequence that village inhabitants now consist chiefly of old men, women, and children.‡

---

* The forest belt occupies more than 66,000 square miles of the total area of 90,000 square miles. Except for comparatively small areas, the land in British Guiana is of low agricultural value and unable to carry a large population.

See *Report on Financial and Economic Conditions in British Guiana*, pp. 5–7, 51. H.M. Stationery Office, 1931.

British Guiana—Annual Colonial Reports, No. 1765, pp. 2–3, 7–8, 22–23. H.M. Stationery Office, 1936.

† "The rural population (less than half the total population in the Colony) is practically confined to the neighbourhood of the rivers. A large proportion of the Colony is absolutely uninhabited, more especially the central mountainous area about which very little is known." *British Honduras—Financial and Economic Position*, p. 11. H.M. Stationery Office, 1934.

So far as South African territories are concerned, the low density rate in Bechuanaland is particularly noticeable—over the whole area an average of less than one person to the square mile. But though this territory is somewhat larger than the area of France, it is to be remembered that more than half of the total area is taken up by the immense waterless stretches of the Kalahari Desert, where population is restricted to a few scattered Bushmen, Hottentots, and Bakalahari, while a considerable area in the north is rendered useless by reason of the prevalence of the tsetse fly. Over the remainder, the population, both human and cattle, may be said to suffer from water shortage for ten months of the year, rainfall in the districts ranging between 10 and 28 inches per annum; as one official Report observes of this somewhat desperate water situation, "It is no empty form that the tribal greeting at the end of any ceremonial proceedings is in the words, 'Pula, pula'—'Rain, rain.'" These conditions will serve to explain how it comes about that the great bulk of the population is to be found in the narrow strip of country along the eastern border where water supplies are less inadequate.*

---

* *Report of the Kenya Land Commission*, 1933, pp. 190–191, 200, 247, 271, 303, etc.

† *The Nyasaland Government Gazette*, Vol. XLIII, No. 32, 15th October, 1936. The extract is taken from the Despatch from the Secretary of State for the Colonies published in this issue of the Gazette.

‡ *Report of the Committee Appointed to Enquire into Emigrant Labour, Nyasaland.* Government Printer, Nyasaland, 1936.

Examples of this kind could be multiplied, but perhaps sufficient has been said in support of the view that figures alone of average population density are likely to prove misleading, whether such figures relate to the Colonies as a whole, to individual Colonies, States, Districts, or smaller administrative units. Below the numerical surface must be sought the diverse factors combining to determine centres which attract and are able to maintain large population groups, and to explain why outside such groups stretch away the communities of decreasing intensity.†

Some of the difficulties associated with population enquiries in the Colonies will be discussed at a later stage in this paper. For the present it is necessary to point out that, so far as available data as presented in Table I are concerned, some of the figures relate to censuses taken in 1921, others are the results of 1931 counts; in some cases intercensal estimates have been calculated with success, in others reporting officers submit what are termed "approximate" figures or "rough estimates" without disclosing how their calculations were made; in yet other cases the population figure has remained unchanged over a series of years.

The individual engaged in statistical enquiries or concerned with the study of Colonial affairs may regard this lack of uniformity of practice as pointing to lax administrative effort on the part of the responsible authorities, though this view would prove a little unsound. Indeed, the significant characteristic of Colonial administration is *variety*, not uniformity,‡ instruments of Government in various fields of work being developed and adapted to meet a variety of complex and diverse conditions. It has been said that the data under review have been extracted from Colonial Medical Reports, but it should be added that the authorities responsible for census-taking, the Registrars-General, and Directors of Medical and Sanitary Services, are usually independently concerned with specific and clearly defined duties; each may, and often will, supply separate population statements in greater or lesser detail. So that for the interested worker there is no lack of published information of one kind or another relating to those widespread territories, and, provided the available facts are handled with caution, they prove of considerable value.

---

* *Financial and Economic Position of the Bechuanaland Protectorate*, 1933, pp. 7, 110, etc.

† In this connection see *La répartition de la race humaine*, by E. Levasseur, *Bull. de l'instit. internat. de Statistique*, Vol. XVIII, 2.

‡ Cf. *The Colonial Service*, p. 2, by Sir A. Bertram. Cambridge, 1930.

‡ A German writer recently observed: "I regard the Empire as the outcome of the highly individual and not easily intelligible English character, which in turn is the outcome of the racial mixture, soil, climate, and history that have gone to make England. Hence it follows that the Empire is as unsystematic and illogical as the Englishman himself." *The British Empire: Its Structure and its Problems*, by Johannes Stoye. Lane, London, 1936.

It now becomes necessary to review the data assembled by the functioning of *registration* practices in constant use, as contrasted with records compiled during the irregular and infrequent population enumerations.

Natality Rates.

For purposes of the present discussion, the value of birth registration for legal and other purposes is regarded as of less interest and importance than is its value from the point of view of Colonial public health administration. Among other valuable public health requirements they are designed to fulfil, natality data should provide a dependable means of measuring to what extent the population of a community is being replenished as the result of natural increase; they are indispensable in all enquiries concerned with the factors of reproduction, while, furthermore, welfare work in the interests of mothers and newly-born children cannot be undertaken with the same feelings of confidence, nor made to function with the same promise of success, if such records are not maintained.

It will be seen that data are available as the result of registration from 39 out of the 48 individual areas mentioned in Table I, the exceptions being Basutoland,* Bechuanaland,† Swaziland,‡ Kenya.§ Tanganyika,|| Nyasaland,¶ Somaliland,** and Northern Rhodesia.†† In one case only does the birth-rate figure stand at a lower level than the corresponding rate for England and Wales in 1934, and

---

* "The Report contains no vital statistics." *Tropical Diseases Bulletin Supplement*, Vol. 33, 1936, p. 79.

† "No records of births and deaths are maintained," *ibid.*, p. 81.

‡ "No data relating to births and deaths are available," *ibid.*, p. 85.

§ "The position in respect to the registration of births and deaths remains unsatisfactory, except in the Nairobi Municipal Area and in one Native Reserve," *ibid.*, p. 35.

|| "No reliable statistics relating to births, deaths, and infant mortality rates are available at present," *ibid.*, p. 50.

¶ "The registration of births and deaths is not compulsory" (an experiment in registration in a limited area comprising 35,500 persons continues), *ibid.*, p. 58.

** "No data relating to births, deaths, or infant mortality are available for the Protectorate as a whole," *ibid.*, p. 70.

†† "There is no system of registration among the natives," *ibid.*, p. 73. In connection with the above, see also Medical Reports for 1934 relating to these eight territories.

with two exceptions also birth rates exceed death rates in all areas, the differences sometimes being considerable. A preliminary survey of the bare figures therefore suggests that as a whole the position is not unfavourable, but what are the conclusions to be reached by delving below the surface?

The lowest recorded birth rate in the table, reading 10·5 per 1,000, is that relating to the British Solomon Islands, the only rate moreover which is lower than the corresponding rate for England and Wales in 1934, viz., 14·8 per 1,000. The disparity between this rate and the English, or other Colonial birth rates is largely a matter of book-keeping. In England and Wales birth registration is complete, and in many Colonial areas, reasonably complete, whereas in the British Solomon Islands the available data refer to but six out of the ten administrative districts comprising the Protectorate. It is important to note, also, that the Report from which the latter data have been extracted supplies none for the Island and district of Malaita, where dwell nearly 50 per cent. of the total native population in the Protectorate; that the majority of them live in scattered and inaccessible fastnesses of the central bush suggests a reason why registration is difficult or impossible among these people.*

Mention has been made of the two areas wherein the death rate appears to have exceeded the birth rate in 1934. One of these, it will be observed from the table, is The Gambia, a West African Colony and Protectorate, but in this territory assembly of data is possible from among the population of the Colony *only*, *i.e.*, from among about 7 per cent. of the total population in the Colony and the Protectorate. It will be immediately clear too, so far as Nigeria is concerned, that if the 4,475 recorded births are related to a population of upwards of 19 millions, the resulting rate cannot possibly be 27·0, but less than 1 per 1,000. Here, however, the data refer only to the Lagos area (Lagos and Ebutte Metta), where the estimated population of 160,000 is a mere fraction of the whole; elsewhere registration has been practically impossible up to the present. Finer analysis of the Sierra Leone figures is equally revealing, for here, of the total 2,306 births quoted, 2,273 were recorded in the Colony alone among 100,587 inhabitants (and more than half of these in the capital city of Freetown), whereas in the Protectorate among approximately 1,672,058 persons, only 333 births were registered; in the Colony only the death rate slightly exceeded the birth rate. It is of interest to note as evidence of the determined attempts of Colonial authorities to secure vital facts, and of the varied methods which need to be applied in backward territories, that in Sierra Leone there are no less than four systems of registration in force, varying in the extent of their compulsion to meet the diverse conditions obtaining in different areas. Registration is (*a*) compulsory in the Colony, but in the Protectorate it is (*b*) compulsory as regards non-natives, (*c*) may be made compulsory for all natives at request of the Paramount Chief to Government, and (*d*) any native *may* make a registrable declaration, *i.e.*, *Permissive Registration* is provided for.

---

* In this connection it is gratifying to note that the Resident Commissioner of the British Solomon Islands Protectorate—F. N. Ashley, Esq.—has been especially active in his efforts towards establishing more dependable records of the people in those remote islands. Under his inspiration and guidance one of his junior officers, Mr. Cadet C. N. F. Bengough, undertook an unusually interesting population survey during 1934–35. This piece of work which was conspicuously successful concerned upwards of 6,000 persons resident in Ariari, a sub-district of the Island of Malaita, and resulted in the assembly of interesting and valuable data.

An equally striking example of the unwisdom of accepting figures at their face value may be found among the Gold Coast data,* where the 9,637 registered births relate to less than 8 per cent. of the total population of the Colony. In this case among 268,880 persons (out of a total population of about three and a half millions) dwelling in 30 established registration centres, the birth rates range from 14 to 65·4 per 1,000. These area rates may not, however, be accepted as accurate measures of the reproductive capacity of the population in the several centres, for their extreme variation is largely due to the fact that expectant mothers will be admitted to, and be delivered of their babies in institutions outside the areas in which they habitually reside; these tendencies serve to raise incorrectly natality rates in some areas and depress them in others. Other influences entering into the problem and combining to bring about considerable variations in recorded birth rates between place and place,† would also include: (*a*) The direct effect of the personal factor in so far as the activities of medical officers and sanitary inspectors are concerned; where such officers are keenly interested and alive to the importance of complete registration, the majority of the births in such areas will be recorded. (*b*) The degree of accuracy attained in making annual estimates of the local popula-

---

* The energy and persistence with which Dr. D. Duff, Director of Medical and Sanitary Services, and Dr. P. S. Selwyn-Clarke, late Deputy Director of Health Services in the Gold Coast (now of Nigeria), have tackled the problem of vital registration in that territory, are worthy of special note. Despite innumerable difficulties and discouragements unknown to European workers, they have contrived to establish upwards of 30 registration centres, and have introduced with conspicuous success improved methods of registration specially designed to meet the needs of backward peoples. There is every prospect that before long the whole territory will be covered by a network of centres engaged in assembling the vital facts characterizing the lives of the inhabitants.

† These influences would also affect local mortality rates. See pp. 194–197 *infra*.

TABLE I.

(Data relate to the year 1934.)

Group and Territory.	Area (sq. mls.).	Population.	Density (per sq. ml.).	Births.	B.R. (per 1,000).	Deaths.	D.R. (per 1,000).	Infant Deaths.	I.M.R. (per 1,000 births).
I. *Mediterranean and Near East.*									
Gibraltar	2	15,847	7,923·5	383	24·2	225	14·2	21	54·8
Cyprus	3,584	359,778	100·4	10,829	30·1	4,749	13·2	1,396	128·9
Palestine	10,100	1,171,158	116·0	45,942	41·6	24,136	21·9	7,245	157·7
Transjordan	No Survey	300,000	?	10,742	35·8	7,925	26·4	2,601	242·1
Maltese Islands	122	255,185	2,091·7	8,544	33·5	5,702	22·3	2,367	277·0
II. *The Far East.*									
The Seychelles	156	29,406	188·5	862	29·3	317	10·8	42	48·7
Mauritius	809	391,867	484·4	13,516	34·5	10,069	25·7	1,754	129·8
Ceylon	25,332	5,551,623	219·2	206,512	37·2	127,070	22·9	35,719	173·0
Straits Settlements	1,246	1,057,108	848·4	42,974	40·7	28,056	26·5	7,387	171·9
Federated Malay States	27,648	1,631,728	59·0	57,697	35·4	34,985	21·4	9,405	163·0
Unfederated Malay States	22,051	1,593,033	74·0	65,413	41·1	35,799	22·5	10,156	155·3
Brunei	2,500	32,971	13·2	*1,306	39·6	*1,237	37·5	*464	355·3
Hong Kong	390	944,492	2,421·8	20,886	22·1	19,766	20·9	7,117	340·8
III. *The Western Pacific.*									
Fiji	7,083	197,449	27·9	7,196	36·4	3,054	15·5	779	108·3
Gilbert and Ellice Islands	200	33,188	165·9	1,035	31·2	781	23·5	339	327·5
British Solomon Islands	11,458	93,893	8·2	†987	10·5	†811	8·6	?	?
IV. *British Tropical Africa.*									
Basutoland	11·716	‡729,000	62·2	No data available.					
Bechuanaland	275,000	‡203,749	0·7			,,	,,		
Swaziland	6,705	129,533	19·3			,,	,,		
The Gambia	4,069	199,520	49·0	§351	§25·0	§438	§31·2	§97	§276
The Gold Coast	91,843	3,444,341	37·5	‖9,637	‖32·9	‖6,550	‖22·3	‖1,016	‖105·4
Nigeria	372,674	19,928,171	53·5	¶4,463	¶27·9	¶2,088	¶13·1	¶532	¶119·2
Sierra Leone	27,945	1,672,058	59·8	**2,306	**22·5	**2,384	**23·7	**530	**233
Kenya	224,960	3,098,920	13·8	Position in regard to registration unsatisfactory.					
Uganda	94,204	3,558,013	37·8	92,710	26·1	73,254	20·6	17,505	188·8
Tanganyika	365,000	5,022,640	13·8	Data at present of little value.					
Zanzibar	1,020	244,104	239·3	4,466	18·3	4,287	17·6	?	?

* Incomplete, see text. † Six districts only, see text. ‡ Estimate based on 1921 Census. § Bathurst only.
‖ Registration areas only. ¶ Lagos area only. ** Mainly the Colony.

TABLE I (*continued*).

Group and Territory.	Area (sq. mls.).	Population.	Density (per sq. ml.).	Births.	B.R. (per 1,000).	Deaths.	D.R. (per 1,000).	Infant Deaths.	I.M.R. (per 1,000 births).
IV. *British Tropical Africa* (contd.).									
Nyasaland	47,949	1,600,713	33·4	No data available for the Protectorate as a whole.					
Somaliland	68,000	344,700	5·1	" " " " " " "					
N. Rhodesia	288,400	1,377,889	4·8	Data available relate to certain villages only.					
V. *British West Indies and Atlantic.*									
Bahamas	4,400	63,763	14·5	2,006	31·4	1,028	16·1	††60	††103·4
Barbados	166	182,440	1,099·0	5,380	29·4	4,176	22·9	1,376	255·8
Bermuda	19	30,937	1,628·3	862	27·9	306	9·9	44	51·0
British Guiana	89,480	323,171	3·6	9,301	28·8	7,980	24·7	1,567	168·0
British Honduras	8,598	54,744	6·4	1,945	35·5	971	17·7	201	103·3
Jamaica	4,450	1,104,775	248·3	34,247	31·2	18,731	17·1	6,199	181·0
Cayman Islands	104	6,143	59·1	172	28·0	55	9·0	?	?
Turks and Caicos Island	166	‡‡5,612	33·8	170	30·2	97	17·2	18	105·8
Trinidad and Tobago	1,980	428,715	216·5	12,743	29·7	7,987	18·8	1,623	127·4
Leeward Islands.									
Antigua	168	33,060	196·8	1,284	38·9	569	17·2	161	125·5
Dominica	304	46,298	152·3	1,563	33·8	706	15·2	167	106·8
Montserrat	32	13,161	411·3	525	39·1	187	14·2	48	93·2
St. Kitts—Nevis—Anguilla ...	152	37,521	246·8	1,416	37·7	803	21·4	256	180·8
Virgin Islands	58	5,480	94·5	Not stated	?	82	14·9	?	?
Windward Islands.									
Grenada (and islands)	133	83,888	630·7	2,698	32·2	1,143	13·6	311	102·0
St. Lucia	238	63,804	268·1	2,211	34·7	1,039	16·3	223	100·9
St. Vincent	150	53,226	354·8	2,087	39·2	771	14·5	228	109·2
South Atlantic.									
Falkland Islands	4,618	2,427	0·5	54	22·2	28	11·5	0	Nil
Totals, Br. Colonial Possessions	2,107,385	57,751,242	27·4	§§687,388	§§11·0	§§440,342	§§7·6	§§118,954	§§173·1

†† Infant Welfare Clinic only. ‡‡ 1921 Census. §§ Incomplete, see above notes and text.

tion—a task of considerable difficulty where large movements may take place as the result of economic circumstances; and (*c*) The age-sex distribution of the population in local areas; for example, at Obuasi, a mining area in the Colony, and for which town a low birth rate is returned, there is a marked excess of males.

Other causes contributing to the striking variations between Colony and Colony, so far as published birth rates are concerned, are as numerous as they are interesting to the foreign observer. On the present occasion only brief references to one or two of these influences will be made at a later stage, but they may serve to suggest how they combine to affect the accuracy of the returns.

Mortality Rates.

The erratic variations observed between *death rates* relating to British Colonial Possessions (Table I), result from the impact of so many factors and influences in a variety of combinations that determination of their relative values as measures of the sanitary condition of a population as a whole becomes, in many cases, little more than conjectural. For example, everywhere in British Tropical Africa, with perhaps the single exception of Uganda, records of death are either not maintained at all,* or such records as are available relate to but limited areas, and as such are no index of conditions prevailing throughout a territory; the result is that computed rates mean little, and become dangerously misleading if attempts are made by their aid to assess general mortality trends, and for all practical purposes useless for attempts to estimate the natural increase of this or that population.

Elsewhere, with one or two exceptions, mortality records range from the moderate to the good, but a general survey of the whole situation leads to the conclusion that inter-Colonial comparison of mortality data is a task to be approached with extreme caution; dependable conclusions are attainable only if the investigator is equipped with a background of knowledge of the principal factors entering into the problem of mortality experience and registration practices encountered in different parts of the Colonial world. The racial composition and age and sex distribution of population, climatic conditions, geographical situation, the efficacy of Public Health measures, the relative deadliness characterizing particular years, the customs and social organization of different races, and the efficiency of registration systems, are some of the influences which work singly or in combination with one another to bring about visible manifestations so far as mortality returns are concerned.

The relative effect of the numerous influences which in their various combinations serve to depress mortality in one Colonial unit or raise it in another, will be referred to at a later stage, attention being confined for the present to the crude rates, with a view to determining how they serve, or fail, to supply measures of the sanitary condition of a population as a whole.

---

* See Footnotes, p. 189 *supra*.

It may be said of the records of *fact* of death (as different from such additional details as age, sex, cause, etc.) which provide the material for the calculation of crude death rates, that they are on the whole more complete and dependable than natality data. Failure to report a death may, and usually does, involve the delinquent in more serious consequences than does failure to report a birth. Then, again, the elaborate ceremonials so frequently inseparable from the interment of deceased persons make it difficult for death to pass unnoticed; concealment and secret disposal, except in inaccessible mountain or jungle areas, become practically impossible, for burial permits are usually insisted upon, issue of such authority being withheld until registration in the prescribed form has been completed.

Bearing these facts in mind, and turning to the published data under review, the variation in crude death rates between place and place is as striking as was observed in the case of natality data, the range extending from 8·6 in the British Solomon Islands to 37·5 in the State of Brunei.

The low rate in the Solomon Islands is a misleading index, for reasons already discussed when natality rates were under consideration—the data were assembled from some, not from all districts; but for purposes of calculating the mortality rate, they were related to total estimated population of the Protectorate; when related to the population inhabiting the six districts primarily concerned, the rate becomes 19·0 per 1,000. The highest recorded rate—37·5 for the State of Brunei—is also an unreliable measure of the force of mortality in that territory. In that State there are two main centres of population only—Brunei (the capital) and Kuala Belait (the centre of oil-field activities)—but outside these the population is sparsely scattered, large tracts are inaccessible and undeveloped jungle. Of the total deaths recorded, over 50 per cent. were registered in the town of Brunei alone, and if Kuala Belait is included, these two centres were responsible for 60 out of every 100 deaths recorded. Little can be, or is, known of mortality in remote areas of the State.

For the Colony of the Gold Coast, the data relate to 30 established registration centres only, and the crude rate has been calculated on the population domiciled in those centres.* For individual centres the mortality rates range from 6·9 to 70·3 per 1,000, results emphasizing the fact that even with the most determined effort to secure dependable facts, unexpected influences will vitiate the accuracy of returns. Ailing natives will travel great distances to seek admission to hospitals remote from their own homes, owing to the fact that for some obscure reason known only to themselves, such hospitals are regarded as possessing a superior reputation over hospitals in their own areas. There is no doubt that hospital deaths of persons not domiciled in the hospital areas, when not transferred to the area of habitual residence of decedents, are responsible for some of the more striking differences noted in the returns.[*]

---

* See p. 191 *supra*.

In Transjordan no proper census of the population has so far been made. The same population figure based on "rough estimates" has been used for some years for the calculation of birth and death rates. Furthermore, it is believed that nomadic or semi-nomadic Bedouins constitute approximately 60 per cent. of the total estimated population. Having regard to estimation and registration difficulties in such circumstances, the reliability of the Transjordan death rate as a measure of the force of mortality in that territory becomes a matter of some doubt.

One of the low rates in the appended table acceptable as correct is that relating to the Seychelles: among the comparatively small population registration is compulsory, and reported to be complete. The climate is healthy, with no malaria; anopheline mosquitoes are not found in the Colony, and the potential danger of their importation by ships arriving from malarial countries within short distances of the Seychelles receives the special attention of the authorities. Frequent sea communication between the Seychelles and Mauritius occurs, but in Mauritius[†] malaria is the principal cause of death, responsible in 1934 for nearly 18 per cent. of the deaths due to all causes in the Colony. Here, the general death rate in 1934, though high by comparison with European experience, was the lowest recorded in any year for the period 1930–34, a result emphasizing the importance of the climatic factor in the mortality experience in some territories. In tropical countries, where malaria is endemic, abundant rainfall usually means increased incidence and mortality, and frequently an increase in cases and deaths due to respiratory affections. But 1934 was a drought year in Mauritius, accompanied by a distinct decline in malaria incidence and mortality, and a fall in the deaths ascribed to diseases of the respiratory system; in that year malaria deaths were fewer by 24 per cent. and deaths due to respiratory affections fewer by over 8 per cent., with a consequent reduction in the crude death rate.

---

[*] Other factors affecting the accuracy of local mortality rates are discussed on pp. 191–194 *supra*.

[†] "Until comparatively recently Mauritius and Réunion in the Indian Ocean were also malaria free," *Manson's Tropical Diseases*, 10th ed., p. 4. "The malaria parasite was introduced in this way (*i.e.*, by importation from outside) in the early sixties into Mauritius," *ibid.*, p. 7.

On the other hand, for British Guiana the rate in 1934 was the highest recorded since 1928, but here again probably due to unusual circumstances. Disastrous flood conditions were experienced during the early part of the year, and there resulted general contamination of water supplies, especially in rural districts. Although water-borne and other epidemics so frequently the sequelæ of floods did not take place, it is significant to note that deaths due to intestinal diseases increased by nearly 30 per cent., and malaria deaths by over 5 per cent. For the 26 registration districts in the Colony, death rates ranged from 13·1 to 40·2 per 1,000, but no information is available in explanation of the range of difference.

Infant Mortality.

Infant Mortality, a subject intimately bound up with the complex problems of population growth, is of special public health importance, and a few moments must be devoted to consideration of the available data. It is common knowledge that, despite all the concentrated attention directed towards Maternity and Child Welfare work in the British Colonial Possessions—work which has definitely contributed to a considerable saving of infant lives in those territories during the past few years—infant mortality, especially in some tropical areas, still remains regrettably high.

It may be seen from the data presented in the appended table that infant mortality rates range from 48·7 in the Seychelles to 355 per 1,000 births in Brunei, and that between these extremes considerable variations and disparities occur within the respective geographical groups. In many cases the published rates must be accepted with reserve, owing to the defective registration methods concerned with the assembly of the raw data; furthermore, no dependable comparison of these rates between one area and another is possible—sometimes the data relate only to limited areas within the boundaries of a territory, in some cases registration has been in force for a comparatively short period and is incomplete, in others, inclusion of stillbirths among the records of births tends to vitiate the accuracy of resulting rates.

Nevertheless, defective though the figures may be, behind them lie items of important knowledge connected with the difficulties encountered when this field of work is undertaken in remote places.

In the Federated Malay States* for 1934 the infant mortality rate showed an increase of 17 per cent. by comparison with 1933 experience; in the Straits Settlements † there was also an increase, but to a lesser degree. The increase was greatest among the Malay section of the population, this element of the population being perhaps more accurately registered and less affected by migration than are some other races in British Malaya. On the other hand, it is curious to note that in the five *Un*federated Malay States,‡ with one exception (the State of Trengganu), infant mortality rates are lower than those obtaining in the Federated Malay States or Straits Settlements, and, what is more, the Malay rate is also much lower than the rate relating to other races. In the urban areas of Ceylon the rate reads 192 per 1,000 births, but for rural areas only 170, a difference of some significance, for 87 per cent. of Ceylon's population are resident in rural areas. These figures suggest that (*a*) registration in rural districts may be less effective, and that (*b*) urban rates may need correcting for residents only, since numbers of expectant mothers from rural districts will travel to, and be delivered of their babies in urban institutions.

Sometimes in territories favourably situated both geographically and climatologically, the rate is unusually high. An example may be seen in Barbados (256 per 1,000), an island about the size of the Isle of Wight, largely visited as a health resort by other residents in the Caribbean Sea, and as a winter resort by visitors from Europe and America; another in St. Christopher with Nevis and Anguilla, these islands comprising one of the five Presidencies forming the Leeward Islands in the West Indies, and considered to be exceptionally healthy, the rates for these islands being: St. Christopher 229·0, Nevis 103·9, Anguilla 109·4 per 1,000 births. The causes contributing to produce these high rates in these apparently favourable environments can only be guessed at. Nearer at hand, the Maltese Islands enjoy an equable climate which is particularly healthy during the winter months, but the infant mortality rate is the highest recorded in Colonial Possessions in the Mediterranean, and the fourth highest recorded for any Colonial Possession in any part of the world. For the island of Malta the rate was 205, and for Gozo 296·7 per 1,000 births; only in three populated centres in these islands was the rate below 200, while in each of thirteen rural districts it exceeded 300. As gastro-intestinal diseases were responsible for more than half of the infant deaths recorded, the various pathogenic organisms present * in the goats' milk so generally used in the islands may have been largely responsible for this high mortality.

---

* *The Federated Malay States* comprise the four States of *Perak, Selangor, Negri Sembilan*, and *Pahang*.

† *The Straits Settlements* in 1934 were the *Island of Singapore* and neighbouring islets, the town and Territory of *Malacca*, the islands and Territory of *The Dindings* (became a part of *Perak* in 1936) the *Island of Penang* and *Province Wellesley*.

‡ The *Unfederated Malay States* are *Johore, Kedah, Perlis, Kelantan*, and *Trengganu*.

Hong Kong shows the second highest I.M.R. in the Table, but a finer analysis indicates that the rate for Chinese alone is 347·3 and for non-Chinese in the Colony 49·8. Birth registration among the Chinese, though greatly improved in recent years, is still far from complete; but even if we regard it as defective to the extent of 33 per cent., the resulting Chinese I.M.R. would be in the neighbourhood of 260 per 1,000. As to Brunei, which occupies the leading place in the tale of Colonial infant mortality experience, it has already been pointed out † that the towns of Brunei and Kuala Belait are the centres showing the heaviest vital records of registered facts. Elsewhere, births, deaths, and infant deaths incline to be registered only in areas having registries conveniently situated so that declarations may be easily made, the latter condition being met in only eight centres in the fifteen districts in the State. It will be obvious that in such circumstances the published data can tell only part of the story.

Even when data are not available for the whole of a territory, the meagre information supplied still enables us to obtain an imperfect but not altogether valueless picture of the toll of infant lives exacted year by year. For example, in Nyasaland an intensive survey of native life was carried out in the Fort Manning District,‡ and in that limited area the I.M.R. was returned as 154·6 per 1,000 births; the experiment is to be extended to other districts in the Protectorate among people differing in tribal habits, customs, and geographical situation. For 411 villages § in Northern Rhodesia, the I.M.R. was stated to be 178 per 1,000 births; in Swaziland, records maintained at the Bremersdorp Welfare Centre return a rate of 265 per 1,000 births, while in Uganda—where successful registration work has been accomplished—in the Northern Province, the rate reaches the high figure of 356·5 per 1,000, falling to 72·1 in Entebbe, Buganda.

Local Conditions and Influences and their Effects.

Behind the published figures briefly surveyed lies an absorbing story of unusual experiences not ordinarily associated with the peaceful byways of medico-statistical practice. Supplementing the discussion of the data, the present opportunity will be used for referring to some of the peculiar difficulties encountered by officers in remote places, in their endeavours to assemble certain prescribed facts.

---

* The most important being *Br. melitensis*, the causative agent of *undulant fever*, an endemic disease in the islands, and which has assumed large proportions recently. Government are installing a plant for the pasteurization of all goats' milk.

† Cf. p. 193 *supra.*

‡ Total population in the area 35,500.

§ Total population in these villages 42,768.

In the first place, it should be pointed out that the introduction and functioning of enumeration and registration systems in some parts of the world are by no means as easily accomplished as many people think. Perhaps progress has been retarded in some cases by a mistaken belief in the applicability of Western ideas and practices, leading to the hasty adoption of European methods involving attempts to impose schemes of work neither asked for nor understood by a race, and of such a kind that they bear no resemblance to procedures and practices with which their own social organization has made them familiar. Legislative enactments may be framed with ease and become law with little or no apparent local opposition, but unless the requirements such enactments desire to implement have first received the support and approval of the people at large, they will prove inoperable. Only those who have experienced it are capable of appreciating the power of the dead weight of passive resistance which can sometimes be brought to bear by a people towards measures which have aroused their dislike, suspicion, or hostility. Bearing these facts in mind, we may proceed.

Few people would be prepared to deny the first-rate importance of population studies, or to define such studies as matters of mere academic interest. They are of vital practical importance to all men, wherever they may live, and whatever their ruling interests may be; for all human interests, and to a large extent personal fortunes and well-being, are influenced by population changes, and by the size, composition, distribution, movement, and trend of communities in various parts of the habitable globe. In the Colonies, and particularly in tropical and undeveloped areas, such studies acquire a special significance; knowledge of the numbers and constitution of a people—however incomplete the data may be during the early stages of enquiry—must be assembled if the machinery of government is to function properly, in order that sanitary measures may be effectively applied, and that there should be available a means of assessing what are the effects upon such people of their contacts with civilization. It is clear that enterprises undertaken on the bases of erroneous estimates of population, or in anticipation of predicted changes which fail to occur, may give rise to grave economic and administrative difficulties.

It may be imagined that, in the light of more than a century's experience of census-taking in Europe, the difficulties and uncertainties attending attempts to secure dependable population records will have disappeared. Unfortunately this is not the case so far as some of our Colonial units are concerned. Under the varying conditions presented and peculiar to diverse cultures in different parts of the Colonial world, attempts to carry out census enquiries on modern lines would sometimes invite failure at the outset; even simplified procedures lead to difficulties, and occasionally actual personal danger, for those entrusted with this important work.

Among the influences contributing to render returns inaccurate, and special difficulties encountered in the course of population enquiries, occur the following.

In many of these territories census proposals are regarded with suspicion, and at times even with open hostility. The prolonged and elaborate preparations involved give ample opportunities for the rise and spread of disturbing rumours among a credulous or superstitious people. A variety of quaint notions ensues to hamper the work, the most popular idea being that the operation is the prelude to some new form of taxation, for the native mind cannot conceive any Government being so foolish as to undertake so arduous and expensive a task without having in view some direct pecuniary gain. There may persist the shadow of a real superstitious fear, perhaps a *tabu* against counting, or even mention of personal names, owing to the belief that magic or evil influences may be exerted through the use of the name of the person. Even if enquiries were limited to discovery of total numbers of a people, the totals would not always be above suspicion. As enumerators record data after interrogation of householders and others, deliberate mis-statements of fact are by no means rare; persons, particularly women, are concealed; deliberate absenteeism is planned whilst the operation is in progress. When it is remembered that enquiries seek to discover not merely the total numbers of a people, but such items as sex, age, civil state, occupation, and other particulars, and that attempts to secure the disclosure of these facts may be regarded as an invasion of the privacy of domestic life and openly resented, it is scarcely surprising to be told that, however carefully planned, an operation sometimes fails to secure dependable records. Consider for a moment how some of the beliefs and customs of a people may affect the accuracy of returns.

The prohibition in regard to mention of personal names, or the reactions of the "bad-luck" concept, may lead parents to omit any reference to the eldest surviving child in the family, whether male or female, this tendency seriously affecting the accuracy of entries in the "*Number of children alive*" column. Among some polygamous communities, the total surviving children returned after interrogation of a husband may be found to be *more* than the combined totals resulting from questioning his several wives, and always one *less* than the actual number of children surviving. These contradictory results would arise in the following manner—in a case of a husband with two wives, the husband, omitting mention of his eldest child. reports *seven* surviving children; each wife, interrogated separately and each omitting mention of her first-born, reports (*a*) four, and (*b*) two, total *six*; but wife (*b*), questioned about the number of surviving children the issue of wife (*a*), gives the true total, viz., *five*, and conversely wife (*a*) reports that wife (*b*) bore *three* children—total of the two wives, *eight*. Where three or more wives and their children are concerned, the differences will of course be greater.

Then, again, *sex* differences as expressed by enumeration results may or may not be misleadingly unreliable, for mis-statements with regard to sex are a fruitful source of inaccuracy during the course of enquiries. Tribal and racial reticence regarding all matters appertaining to female relations may, and frequently does, lead to the deliberate concealment of women and girls, and a wilful misstatement of numbers. Various attempts have been made to explain sex differences which are observed to vary widely from European experience, but satisfactory proofs are difficult to obtain. Where an unusual excess of males is noted in returns, the explanation has been variously attributed to actual enumeration errors, to the overwhelming desire for male children, to the application of native artificial medicines and methods supposed to influence the sex of children *in utero*, to abortion if the unborn child is predicted to be a girl, to high mortality among females at early ages due to the notorious neglect of girl children among some cultures, to the evil effects of child marriage, to exacting ceremonies connected with pregnancy and unskilful native midwifery methods, all of which combine to raise the mortality rates amongst young females.

Perhaps that column of the schedule concerned with *age returns* provides the most troublesome branch of enquiry for census agents, for the simple reason that ignorance of precise age is almost universal amongst many races in the tropics, added to which a combination of prejudices, superstitions, beliefs, and *tabus* serves to make age enquiries unusually difficult. Among some peoples even to discuss age is regarded as extremely unlucky, while to state one's age correctly is considered the height of folly and calculated to reduce one's length of years; to these beliefs must be added the religious rules met with from time to time, and which may expressly demand concealment of age from others. Then there exist curious customs relating to methods of counting—age may be assessed from the date of conception and not from birth, or periods of time may be measured by successive harvests, or the first birthday may be dated from some conspicuous festival and not from the date of birth, as is the Chinese custom. It will be gathered that age returns in many tropical areas call for intelligent guessing by census agents, though it will be clear that native enumerators who are doubtful of their own ages can scarcely be expected to determine with any great degree of accuracy the ages of others.

Many customs and beliefs peculiar to different cultures play their part in adversely affecting returns under the heading of "Civil State." Sometimes attempts to procure disclosure of the relevant particulars are regarded as an invasion of the privacy of domestic life, as such openly resented, and where replies are given, deliberate mis-statements of fact may be resorted to. Then, again, the custom of marrying individuals to gods or goddesses may result in such individuals being returned as "married"; or where a measure of social stigma is held to attach to families having daughters of puberal age yet still unmarried, such daughters will invariably be reported as "married," while prostitutes and concubines will insist upon their inclusion in the same category. On the other hand, divorced persons and adult spinsters of no marriageable value seem to show an inclination to define themselves as "*widowed*."

Another troublesome and complicated section of census work is that concerned with "*occupation*." In the first place, the terms themselves provide endless difficulties for poorly educated enumerators who are not always able to distinguish the precise meaning of such terms as "earner," "dependent," "principal and dependent occupations," if and when such terms are on the schedule, for at different times of the year an individual may follow one or other of a dozen occupations. Shopkeepers may also be money-lenders, dealers in wool, grain, etc., or a person holding a minor official appointment may derive the larger proportion of his income from rents, the cultivation of land, or other sources. The general result seems to be that persons are inclined to report only the occupation which to them appears to convey the idea of greater prestige or importance, and to disregard entirely any other aspect of the question.

These brief references which discuss only the fringe of the subject must inevitably convey but a faint idea of the exasperating difficulties associated with population enquiries in some of our Colonial Possessions. Even such an apparently simple item as *house numbering* will give rise to vague suspicions, objections, or misconceptions which, translated into action, may almost wreck the organization so laboriously set up. Some householders will resort to the simple but disorganizing practice of effacing the numbers, or in less law-abiding places the disposition may lie towards effacing the enumerator responsible for the distribution of house numbers. Sometimes excessive zeal on the part of the native agents will lead them to paste the numbers on latrines, presumably under the impression that such resorts are "inhabited places"; they have been known to distribute the numbers indiscrimately, thus losing their serial order, so that the whole operation had to be undertaken a second time.

Perhaps sufficient has been said to permit one to express the view that even though results do not always attain the hall-mark of complete accuracy, our Colonial colleagues responsible for these difficult and at times hazardous enterprises deserve not our criticism, but our whole-hearted sympathy and generous appreciation for the remarkable success they are able to secure in the face of formidable obstacles.

Registration Problems.

And what of the *registered* facts? Are they also affected by local conditions and influences to a degree which serves to render them untrustworthy?

Of this branch of work it may be said that *registration of births* is by no means popular among some peoples. To report the fact of a birth at some more or less distant registration centre may involve expense of money as well as of time, and the declarant may fail to envisage any compensatory advantage. Indeed, he may readily consider it a decided advantage *not* to declare the fact, in the belief that if in a more or less remote future his child may officially be called upon to disclose his age, he may then be able to resort to an *ad hoc* estimate without the fear of being confronted with inconvenient documentary evidence in contradiction of his statements. In many areas female births are more readily declared than male births. In some places it is thought unlucky to discuss newly-born children with strangers, and where this belief prevails, every endeavour will be made to avoid registration. Or again, local birth customs may demand the isolation of mother and child for a more or less extended period after birth, or may require the mother to be delivered of her child at the home of one of the grandparents or other relation, perhaps at a place remote from the area of habitual residence of the actual parents. Such cases are easily overlooked, and with the lapse of time parents may conveniently forget to register.

Where, and in spite of these and innumerable other obstacles, officers have succeeded in developing among a people the habit of regular, immediate, and voluntary declaration of the facts they require, they have usually been the kind of men who have realized that the work is not mere purposeless routine, but an important component of public health machinery demanding special consideration if it is to function efficiently. Armed with this consciousness, they have equipped themselves with a knowledge of the social organization and culture of the people among whom they work, and have endeavoured to understand the meaning of some of the ceremonies, customs, treatments, and discomforts locally associated with childbirth. This knowledge is of first-rate importance, and the methods applied in acquiring it of at least equal importance, for the keen officer, by continually moving about among the people and by developing a genius for gossip, gradually loses some of the identity usually associated with the official engaged in inconvenient investigations, and his enquiries come to be regarded as harmless or even beneficial. Many of the traditional rules and practices concerned with conception, pregnancy, and birth * may seem strange to the foreign observer, but it is well to remember they are regarded as of considerable social importance. From our point of view they may be interpreted as supplying in some measure, if not entirely, the place of the more hygienic and moral rules obtaining in our own countries, since they are primarily directed towards ensuring what is best for mother and child during the pre-natal and post-natal periods of life.

With regard to the *registration of deaths*, obstructive influences serving to hamper progress may be due to local beliefs concerning the origin of *disease* and *death*, or the specific opposition brought to bear by persons having vested interests.

Beliefs concerning the causes of disease and death may vary between bewilderingly wide limits, and differ fundamentally from the ideas and beliefs of those attempting the introduction of sanitary reforms. The malevolence of spirits, the intervention of the super-natural, wind demons, disobeyed *tabus*, and other peculiar conceptions are among the varying beliefs and superstitions * tending to provide difficulties of no mean order for officials seeking the assembly of records of deaths and causes of death. And to these must be added the problem of vested interests in the person of the local medicine-man, whose opposition may be considerable.

---

* *E.g.*, pre-natal *tabus* may forbid the use of certain foods believed harmful, specific tasks may not be undertaken, etc. It may be noted with what frequency prohibitions apply to acts or symbolize certain difficulties associated with childbirth. During the post-natal period food *tabus* must be observed by nursing mothers, specific ornaments or body marks will be carried to ward off evil influences, other signs of pregnancy and recent motherhood exempt wearers from certain tasks involving heavy labour, etc.

The following among other studies discuss some of these curious customs and beliefs :—

The Pagan Races of Malaya, Vol. II, p. 21, by W. W. Skeat. London, 1906.
The Fellāhīn of Upper Egypt, pp. 63 *et seq.*, by W. S. Blackburn. London, 1927.
Melanesians and Polynesians, by G. Brown. London, 1910.
Pagan Tribes of Borneo, Vol. II, pp. 155–9, by C. Hose and W. McDougall. London, 1912.
Twenty-five Years in East Africa, by J. Roscoe. London, 1921.
Marriage and Childbirth among the Kanuri, R. E. Ellison, *Africa*, Vol. IX, No. 4, pp. 533–5, 1936.

In this connection it is of interest to note that under all cultures, whether primitive or civilized, there is to be found a specialized group of workers actively concerned with morbid conditions affecting their fellows. They pass under a variety of names—doctor, medicine man, witch-doctor, sorcerer, and so on—but whatever the title, the function is the same—namely, the treatment of disease and the postponement of death. Under some cultures this individual may exert profound influence among the people at large. His attempts to discover which particular spirit, wind demon, or enemy has been offended and how—which *tabu* has been disobeyed, which ceremonial rite has been neglected, or which particular evil spirit has captured the soul of the patient and is holding it to ransom—involves the use of impressive and mysterious rituals; these carry a strong religious flavour, and it is difficult to determine whether curative magic, religion, priest, or medicine-man supplies the more important element in the practice of the art. The influence of this body of workers is, however, a factor which cannot safely be disregarded, and, realizing this, officials have sometimes profitably secured their co-operation when endeavouring to introduce schemes of work which closely touch the jealously regarded prerogatives of these local specialists.

These brief references to unusual beliefs and customs are designed to emphasize some of the outstanding difficulties which are encountered in remote places when Colonial authorities attempt to provide for the collection of facts relating to mortality within the boundaries of a territory.

The causes of the deplorably high *infant mortality* are legion. The poor viability of immature children, contaminated food and water, and insanitary living conditions, make the rearing of infants an extremely precarious business in some parts of the world. Ignorance, widespread use of harmful native drugs, motherhood beliefs, prohibitions and customs carrying with them the imponderable weight of immemorial tradition, together with unskilful midwifery methods, are among the causes responsible for the heavy sacrifice of infant lives among some cultures.[*]

---

* Among other works the following might be consulted :—

Pagan Tribes of Borneo, Vol. II, pp. 206–9, by C. Hose and W. McDougall. Macmillan, 1912.

Peoples of the Chittagong Hill Tracts, by J. P. Mills, S. S. Chandhuri, and N. K. Dutt, contained in *Census of India*, 1931, Vol. V, Bengal and Sikkim, pp. 514–538.

Pagan Races of Malaya, Vol. I, pp. 421–8, by W. W. Skeat. Macmillan, 1906.

While many infant deaths may be due to constitutional weakness, a high percentage of the remainder may be due to starvation through the use of improper foods, for it is to be remembered that among some races there is available no suitable food for newly-born children except breast-milk. Breast-feeding will be supplemented from birth by the use of thin sour porridge,[†] and give rise to sickness and perhaps a high mortality. Or if during the suckling period and long before an infant can safely dispense with breast-feeding, the nursing mother is faced with a second conception, and lactation ceases, thereafter the child lies at the grave risk of being unable to survive.

Then under some cultures the belief prevails that *colostrum* is unclean and even poisonous, so that for the first ten days of life the child must not be put to the mother's breast. In such cases it will be suckled by other women, or, if this is impossible, fed on undiluted goat's or cow's milk, be given gruel made from mealies, the juice of coco-nuts, or be supplied with taro, yam, etc., pulped by chewing.

All these practices are unwholesome—the chewed foods can scarcely prove anything but harmful to the infant. It is true that as *ptyalin* is not secreted in appreciable quantities by infants under one year, the chewing process enables the mother to supply from her own mouth the moisture, warmth, and *ptyalin* for conversion and solution of the starchy foods with which she feeds her child. But the benefit is considerably modified by the risks of diarrhœa and other intestinal ailments which might result from the practice, while further, pulped foods such as yam, taro, etc., carry additional risks by reason of their indigestibility.

Sometimes pregnancy customs operate harmfully. It is the practice among some races as pregnancy proceeds for native medicines to be taken in increasingly large doses, the effects being reflected in high abortion, miscarriage, and stillbirth rates; similar practices followed during delayed labour are a serious menace to delivery, and frequently the cause of death of both mother and child. In other cases women will be subjected to food prohibitions during pregnancy, the underlying idea being that a modified form of starvation will ensure easier delivery.[‡] These are but a few of the curious beliefs and practices which must be taken into consideration when the infant mortality rates among strange people in remote places are to be investigated: but though they discuss the mere fringe of this important work, perhaps they may be deemed sufficient to indicate some at least of the factors responsible for the large proportion of infant deaths occurring in some parts of the world.

---

[*] See among other studies:—
Pagan Races of Malaya, Vol. II, pp. 2, 7–18, 21 *et seq.*, by W. W. Skeat. Macmillan, 1906.
The Fellāhīn of Upper Egypt, pp. 63 *et seq.*, by W. S. Blackmore. Harrap, 1927.
Melanesians and Polynesians, by G. Brown. Macmillan, 1910.

[†] This is the national practice in Swaziland for example.

[‡] *E.g.*, Wadigo and Masai (East Africa) mothers starve for three months before delivery in the hope of a smaller child and easier confinement. See also *Medical Report*, Kenya, 1933, p. 32.

The difficulties facing medical officials and collectors of data in this field are stupendous—and, curiously enough, it is the women themselves who so often constitute the most serious difficulty, for they appear to cling to old customs and beliefs, and will more strenuously oppose reformative schemes than will their men-folk. The mere establishment of ante-natal and maternity centres will not solve the problem—pregnant women will not attend for ante-natal advice or for delivery of their babies just because such centres have been set up by Government. This conclusion is amply supported by accounts appearing in Colonial Medical Reports,* and every effort is made to break down this reluctance. It may frequently be noted of women persuaded to attend such centres for advice, treatment, and delivery, that only a very slender proportion of them are women native to the country, though here and there instances could be quoted of remarkable success in this direction achieved by Lady Medical Officers.† Thus progress is being made, and made by the exercise of unbelievable patience, persistence, tact, sympathy, and respect for the beliefs and prejudices of the people concerned.

Sickness Records.

Before bringing this restricted survey to a close, it becomes necessary to consider for a few moments such records of sickness as may be available in various Colonial territories, and discover what lessons they have to teach.

It is usual to regard death rates in the Colonies and elsewhere as measures of the sanitary conditions of a country and its people, and it is generally agreed that, despite their many defects, such rates do provide evidence of value. Nevertheless, it is well to remember that for every death recorded as being due to a specific disease there will occur an average number of persons suffering from non-fatal attacks of that disease. It may be observed also that, so far as Colonial data are concerned, the majority of recorded deaths appear to be due to preventible diseases—acute and chronic intestinal and respiratory affections, many of the diseases peculiar to infancy, insect-borne diseases, such as malaria and so on, figuring prominently in the returns. And finally there occur the larger group of persons suffering from ailments demanding treatment yet which rarely or never terminate fatally, but remain year after year a serious cause of disability of more or less extended duration, and as such constitute problems of grave economic importance.

---

* *E.g.*, Hausa women, among others, show a decided reluctance at present to attend such centres.

† Over 80 per cent. of the maternity cases attended in Kedah, one of the Unfederated Malay States, were Malay women. The work in this State under the direction of Dr. Mabel Brodie was conspicuously successful.

In these circumstances Public Health Authorities are compelled to devote serious attention not only to records of *fact* and *causes of death*, but also to available records of sickness, subjecting these to detailed analysis with a view to the discovery and removal of the predisposing causes giving rise to diseased conditions.* By this means they may assist in protecting a people, whether primitive or civilized, from the consequences of their own folly, indifference, selfishness, or carelessness, introduce more effective improvements of a sanitary nature, and contrive to teach such people how to live healthier, happier, and longer lives.

Such records as are available, compiled as they are by Medical Officers, native dressers, and other *personnel* of the several Colonial Medical organizations, are merely records of in- and out-patients treated during the year at the various established hospitals and dispensary centres. The figures themselves reflect only the *incidence of the various diseases among persons attending such centres for treatment*, and are *not* to be regarded as a measure of the relative incidence of the various diseases among the population at large; for it is to be remembered that as exceedingly large populations may be widely scattered over extensive areas, the result may be that even out-patient attendances by sufferers may be possible only by the minority residing within reasonable distance of such centres.

As regards the machinery of recording the relevant facts, in actual practice, usually the record will be made of *the most obvious complaint from which the attending patient appears to be suffering*, though such record may be no descriptive guide to the general condition of that patient. For example, of a patient reporting "sick" at a treatment centre, brief clinical examination may reveal signs of malnutrition, enlarged spleen, ulcers, yaws, etc., but if time and diagnostic facilities are available, the same patient may be shown to be infested with intestinal worms, or be suffering from dysentery, syphilis, or other disease. In fact, in some parts of the Colonial world it is undeniably true that the majority of natives are diseased throughout their lives, being to a considerable extent parasitized by helminthic and protozoan infections. In these circumstances, the examining Medical Officer will have to determine *which of many ailments* demands immediate treatment, and only the selected condition among many may be recorded. Such are the data at our disposal.

---

* "Diseases are more easily prevented than cured and the first step to their prevention is the discovery of the exciting causes. The registry will show the agency of these causes by numerical facts and measure the intensity of their influence."—Letter to the Registrar-General from William Farr contained in the *First Annual Report,* 1839.

Investigators hampered by the incubus of a strict regard for *complete* reliability in the facts they are called upon to handle may conclude it were profitless to fish in waters so clouded by uncertainty and inaccuracy, and their view would even secure the support of some Colonial Medical Officers who have not hestitated to record the opinion that Colonial hospital and dispensary records are practically useless as an indication of the incidence of disease.

So they are, if they are to be regarded as representative of conditions among the population at large. So treated they will as readily distort the picture of morbid conditions and fail to reflect the reality of things as they actually are, by as wide a margin as would occur if the same facts were considered within narrower limits but carelessly and unscrupulously misinterpreted by bias. But within these extremes, it is submitted, some action is possible with the facts, permitting the belief that such records are not altogether valueless; * on the contrary, by their aid we may be introduced to the discovery of layers of experience whose very existence the majority of us have never faintly realized.

With these thoughts in mind, and in an endeavour to provoke a measure of curiosity and interest in a much neglected branch of Colonial medical experience, a selection of ten important causes of sickness in the Colonies has been made and some of the facts set out in Table II. It will be observed that the table in question merely presents a bald summary for each of the five geographical groups discussed in the present essay; greater detail was not possible, for to tabulate the relevant facts for individual Colonial territories would unreasonably raise printing costs, demand excessive space, and would require much more time for their analysis and interpretation than can be spared on an occasion like the present. For these reasons only the salient features of these experiences can be referred to.

According to the Medical Reports under review, figures relating to cases of disease during 1934 assumed almost astronomical proportions. In the aggregate throughout these territories, approximately 20 million cases received treatment for one ailment or another. *Malaria* was responsible for roughly 3 millions of the total, *helminthic diseases* a million, there were half a million cases of *yaws*, 400,000 cases of *venereal diseases* ; *dysentery, sleeping sickness*, and *tuberculosis* each claimed their tens of thousands, thereafter other causes tailing down to *blackwater fever* with a mere five hundred or so.

---

* "If used wisely and with due regard to their limitations such data are still of value." *Safeguards in the Publicity Use of Vital Statistics*, by A. W. Hedrich, *American Jour. Pub. Health*, Vol. 24, pp. 338–41, 1934.

And yet, despite the magnitude of these figures, they are incalculably incomplete. In some cases in-patient cases only are recorded, in others dispensary treatments are ignored. Their inclusion would have served to have raised the totals to even greater heights.

In an effort to measure the relative importance of the ten selected causes in the five geographical areas, the proportion for each cause per 1,000 total cases treated for all forms of sickness has been calculated (Table II). It will be seen that in Colonies in the Far East over 30 per cent. of all cases treated were patients suffering from *malaria*, a proportion which falls approximately to 9 per cent. for the West Indies, 5 per cent. for British Tropical Africa, 2 per cent. for the Mediterranean, and less than half of 1 per cent. for the Pacific Group. Within these groups local malaria experiences vary between wide limits; what is more, the proportions in many cases probably greatly under-estimate actual malaria incidence. In support of this belief it may be observed that in some areas it is thought probably *two-thirds* of the total population suffer from the disease.

Of *malaria*, so aptly described as "the curse of the Tropics," one or two interesting features characterizing Colonial experience during 1934 appear to call for mention.

In the Far Eastern Group during the year under review, in Ceylon alone over two and a quarter million cases were treated, for the last quarter of 1934 saw the beginning of the unprecedented malaria epidemic in the Island, a disaster of the first magnitude, since in the course of seven months or so it was responsible for the destruction of some 80,000 lives.* In the Federated Malay States and Straits Settlements (British Malaya) only in-patient cases appear to receive mention; in these territories also "*fevers unspecified*" (among which the majority may be cases of malaria) are returned in unusually large numbers.† Anopheline mosquitoes are not found in the Seychelles, and no case of malaria has occurred in the Colony since 1931, yet in the Island of Mauritius, a few hundred miles away, malaria is the most important cause of death.‡

---

* For an admirable account of this catastrophe the reader is referred to the Report of Dr. R. Briercliffe, C.M.G., the then Director of Medical and Sanitary Services, Ceylon (*Sessional Paper*, XXV, 1935).

† For example, total deaths due to *malaria* in the F.M.S. were 761, and of "*fevers of undefined origin*," 13,687.

‡ In this connection, see footnote, p. 196.

TABLE IA.—(*Totals and Averages by Geographical Groups on the Basis of Available Data.*

Geographical Group.	Area (sq. mls.).	Population.	Density (per sq. ml.)	Births.	B.R. (per 1,000).	Deaths.	D.R. (per 1,000).	Infant Deaths.	I.M.R. (per 1,000 births).
I. Mediterranean and Near East ...	*13,808	2,101,968	*130·5	76,440	36·4	42,737	20·3	13,630	178·3
II. The Far East	80,135	11,232,228	140·2	409,166	36·4	257,299	22·9	72,014	176·1
III. The Western Pacific	18,741	324,530	17·3	9,218	28·4	4,646	14·3	†1,118	†134·2
IV. British Tropical Africa	1,879,485	41,553,351	22·1	‡113,900	‡3·9	‡89,001	‡3·1	‡19,680	‡172·8
V. British West Indies and Atlantic ...	115,216	2,539,165	22·0	78,664	30·9	46,659	18·4	12,482	158·7
All Groups	2,107,385	57,751,242	27·4	§687,388	§11·9	§440,342	§7·6	§118,954	§173·1

* Excludes Transjordan. † Data lacking for British Solomon Islands. ‡ Data incomplete, see text.
§ Incomplete, based upon available data, see text.

TABLE II.—*Proportional Sickness Rates * for certain Selected Causes by Geographical Groups.*

(Calculated per 1,000 total cases *all causes* recorded.)

Geographical Group.	Malaria.	Blackwater Fever.	Enteric Fever.	Dysentery.	Sleeping Sickness.	Helminthic Diseases.	Leprosy.	Venereal Diseases.	Yaws.	Tuberculosis (all forms).	Pulmonary Tuberculosis.
I. Mediterranean and Near East	17·2	†?	2·2	0·8	0	0·4	0·1	2·6	0	2·6	0·7
II. The Far East	312·1	0·01	0·5	6·2	0	97·6	0·6	7·0	5·7	2·1	1·9
III. The Western Pacific ...	0·4	0·01	0·3	2·9	0	25·5	3·7	0·5	70·4	1·5	1·4
IV. British Tropical Africa ...	47·5	0·06	0·3	2·8	8·2	27·4	2·2	41·7	67·8	1·6	1·2
V. The West Indies and Atlantic	91·9	0·05	3·4	2·3	0	44·5	1·0	51·0	45·2	3·4	2·9
All Areas	175·3	0·03	0·7	4·2	—	60·1	1·2	21·6	60·1	1·9	1·5

In the West Indies, indigenous malaria with its conveying mosquito continue to absent themselves from the Bahamas, Bermuda, and Barbados, the only cases seen in these Islands being those occasionally "imported." But in Antigua malaria persists as the most important disease with which the medical authorities have to deal, and in Dominica prevalence is considerable. It is curious to note that other territories in the Leeward Islands do not share this unfortunate experience; in Montserrat only one case was reported, while in the Presidency of St. Christopher and Nevis with Anguilla, anophelines, though present in Nevis, have not yet been identified in St. Christopher or Anguilla, nor, in spite of daily communication between the islands, do the insects appear to have spread from one island to another. On the other hand, so far as the Windward Islands are concerned, though malaria is not a major problem in St. Vincent, in other islands in the group considerable incidence is noticeable.

Having regard to the large populations at risk and the widespread nature of the infection, the numbers of malaria cases reported from British Tropical Africa can scarcely be regarded as being even remotely representative of malaria incidence in those territories; in the aggregate they amounted to barely 10 per cent. of the cases reported from the Far Eastern territories. These differences are all the more striking when it is remembered that in British Tropical Africa there exist areas where the whole resident population lives in a malarious environment, and where anopheline house or hut infestation is exceedingly high. The results of special small-scale malaria surveys in different African Possessions indicated that malaria parasites were present in the blood of from 20 to 80 per cent. of the number of persons examined. In one case, among a population of 7,340 persons, no less than 5,540 cases of malaria were diagnosed, in another it was stated that practically 100 per cent. of the people were affected.

In the Mediterranean Group, malaria is unmentioned in the Report for the Maltese Islands; for Gibraltar, where malaria and other insect-borne diseases are not endemic, only 5 cases were reported. Farther east, however, malaria cases formed approximately 10 per cent. of the total in- and out-patient treatments during 1934. Figures for cases in Palestine and Transjordan may be misleading, for many undiagnosed fevers are apt to be recorded as malaria. It is of interest to note that of Transjordan, the migration of people from areas affected by drought conditions to the Jordan Valley and other malarial regions was responsible for a considerable increase in the numbers of recorded malaria cases.

As regards the Pacific Group, it may be noted that anopheline mosquitoes are not found in Fiji * and strict regulations are enforced upon all vessels arriving from malarial ports. In the Solomon Islands these pests are generally distributed, while in the Gilbert and Ellice Islands there are no anophelines, but one species of culicines is said to be uniformly exuberant; these act not as carriers of malaria, but as the intermediate hosts of the filaria parasite. Indeed, throughout the Pacific Group mosquitoes function less as vectors of malaria than they do as agents for the transmission of *filariasis* and *elephantiasis*, both of these diseases being commonly met with in certain islands. These facts may serve to explain why only 84 cases of malaria appear to have been recorded for the whole Group,* one from Fiji—probably an "imported" case—and 83 from the British Solomon Islands, where a single death due to the disease occurred.†

Limits of time prohibit discussion of other aspects of malaria experience in the Colonies. On the present occasion it must suffice to add that Colonial Medical Reports contain a wealth of information descriptive of the numerous factors entering into the malaria problem; the variety of anophelines acting as infective agents in different parts of the Colonial world, the occasional incrimination of a species not hitherto regarded as a dangerous carrier of the disease, of species dependent upon high rainfall for mass breeding, of others which flourish more abundantly during a dry season, of malaria control measures—these are but some of the interesting subjects to be found discussed by Colonial Medical Officers within the covers of the Annual Reports under review.

When we turn to consideration of the data relating to *helminthic diseases* we are confronted by an unusually difficult interpretative problem. According to available facts (Table II), incidence is highest in Colonies in the Far East, second, third, and fourth places being taken by the West Indies, British Tropical Africa, and the Pacific respectively. But one is driven to the conclusion that the data cannot be regarded as indicative of actual prevalence throughout the various geographical groups. In the first place, the figures merely record the *numbers of patients treated*, and when it is remembered that vague stomach pains and other intestinal disturbances may be, and frequently are, regarded by natives in charge of rural dispensaries as separate entities, and not, as they may well be, manifestations of helminthic infections, the returns will be grossly inaccurate; it must be remembered also that in many cases helminthic infections produce no positive symptoms, natives are loth to seek treatment for their ill-defined gastric ailments—probably in the case of no other common disease is so small a proportion of a population of the infected treated each year as in that of intestinal worms. Then, again, where returns are excessively large they may result from special intensive investigations,* though such enquiries are by no means common in all territories; and in some cases reporting officers provide no quantitative data, but are content to refer to helminthic diseases by such conjectural expressions as "very prevalent," "widespread," and so on.

---

* Professor P. A. Buxton refers to the absence of anophelines and malaria in Fiji in his *Researches in Polynesia and Melanesia*, p. 67, Parts I–IV (relating principally to Medical Entomology). Published by the London School of Hygiene and Tropical Medicine, July 1927.

See also *Strange Places and Strange Peoples*, by Sir Reginald St.-Johnston, p. 58. London, 1936. The author was originally in the Colonial Medical Service, and a Medical Officer in Fiji.

† For further information regarding the incidence of *filariasis* and *elephantiasis* see, among other works:—

Researches in the Western Pacific, by F. W. O'Connor, pp. 11–26, 29–38. Research Memoirs of the London School of Tropical Medicine, Vol. IV. 1923.
Buxton's *Researches* (see above), pp. 230–237.
Manson's Tropical Diseases, edited by P. Manson-Bahr, pp. 686 *et seq.* 10th Edition. London, 1935.

But despite all deficiencies, the data are of value. They are usually presented tabulated for each type of helminthic infection, and after examination of these facts it becomes clear that (*a*) these infections are responsible to a considerable extent for the ill health of native populations in all groups with the exception of the Mediterranean, (*b*) promiscuous defæcation by natives on ground near their dwellings, and careless pollution of water supplies encourage continued infestation in man, and (*c*) until public and personal hygiene in many areas are far advanced beyond their present stage, no serious abatement of these infections can be expected. As to types of infection, and again summarizing very generally, it may be said that throughout the Tropics, (*a*) Hookworm (*ankylostomiasis*) is a main cause of chronic ill health and often of death; of hospital admissions here and there a certain proportion of cases are characterized by a grave anæmia and extreme debility, and patients are sometimes so ill on admission that recovery is hopeless. Incidence varies between wide limits according to territory, but the data suggest that from 31 to 85 per cent. of natives examined were infected with hookworm; (*b*) *Schistosomiasis* appears to have a curiously local incidence; it is restricted to one locality in Cyprus, is the only helminthic disease of any consequence reported from Bechuanaland and Swaziland, occurs in Mauritius but seems to pass unnoticed elsewhere in the Far East, appears to be exceedingly prevalent in Tanganyika and Nyasaland, but is less common in some other East African Colonies. These conclusions, based as they are upon available data, must, however, be accepted with very great reserve: it was observed, for example, of one territory from which only 4 cases of schistosomiasis were returned, that as the result of a special survey of a limited area of the territory, the ova of *S. hæmatobium* were present in 30 per cent., and clinical signs of schistosomiasis observed in 52 per cent. of all persons examined. *Tapeworm* infestations are common among certain meat-eating people whose standards of cooking and sanitation are poor; *guinea worm* tends towards a special prevalence in limited districts—it appears excessively common in Uganda; but here again the excess may be due to more careful diagnostic and recording results.

---

* In Ceylon, for example, approximately 2 million treatments were recorded in 1934.

It is unnecessary to examine in similar detail the data relating to the remaining titles in the table; of all it may be said the facts are more or less incomplete, and that the figures do not reflect the true incidence of these diseases.

Yet, despite their incompleteness, the data are of value. The importance of *yaws* * as a common cause of disablement throughout British Tropical Possessions becomes at once manifest. It is especially prevalent in the Pacific, where the ready inoculability of the disease is scarcely yet realized, and where it seems to be regarded as inevitable in childhood and viewed with no more concern than are teething troubles by European parents. In British Tropical Africa 60 per cent. of the total cases are recorded in East African Possessions, and 38 per cent. in the Colony and Protectorate of Nigeria. *Venereal diseases* are met with everywhere, incidence being unusually high in the West Indies and in British Tropical Africa. Taking the latter as a whole, *syphilis* would appear to occur with four times the frequency of *gonorrhœa*, yet among West African Possessions gonorrhœa is the more prevalent. Syphilis is not found among native races in the Pacific, and is but rarely met with in Brunei, but gonorrhœal infections are prevalent. *Sleeping sickness* is confined to British Tropical Africa, where upwards of 50,000 cases were recorded during the year under review. Of the total something like 90 per cent. were recorded in Nigeria alone, a result probably attributable to the work of the Tsetse Investigation teams continuously at work throughout the year. Of the total cases reported from East African Possessions 60 per cent. occurred in Tanganyika.

Recorded cases of *leprosy* number approximately 20,000, though it is difficult to determine how far these figures under-estimate the actual incidence of this disease of semi-civilization: for example, it is a notifiable disease in Hong Kong, yet in that Colony the number of lepers is unknown. But available returns show that over 60 per cent. of the cases are recorded in British Tropical Africa—mainly in East and West African Possessions—and 26 per cent. in the Far East. Of the latter, 60 per cent. of the cases were recorded in British Malaya, where the leprosy problem differs in an important respect from that of most other countries, in that it chiefly concerns the Chinese, many of whom are immigrants probably bringing the disease with them.

---

* *Frambœsia Tropica*, by G. H. Hermans, Leyden, 1921, provides an exhaustive study of the disease.

For the rest, it may be said that just how widespread is *tuberculosis* * in the various parts of the Colonial Empire is not known, though there is little doubt the records present but a fraction of the actual number of sufferers; a striking feature characterizing available returns is the high proportion of cases of the *pulmonary form of the disease*—approximately two-thirds of the total cases of tuberculosis (all forms). As regards *enteric fever* and *dysentery*, polluted water supplies, insanitary habits, and unhygienic living conditions, combine to favour the spread of these infections; having regard to the large populations at risk, the figures seem absurdly small, due no doubt to a considerable extent to the lack of diagnostic facilities in out-of-the-way places. Probably a very large number of recorded cases of enteritis, diarrhœa, etc., are really cases of typhoid or dysentery.

Conclusion.

It will long have been realized that the present essay has attempted nothing more than an introductory survey of some of the information made available as the result of population enquiries, or contained in the life and death registers maintained in the various territories comprising the Colonial Empire, and that by gathering a fragment here and there only an imperfect glimpse of the story of human profits and losses characterizing life under a variety of conditions and influences has been provided. The arbitrary choice of items for mention has left important gaps unfilled, but it is hoped sufficient has been said to justify the opinion that such data as have passed under review must be regarded as essential items of political knowledge, and fundamental to the smooth and efficient functioning of the complicated machinery of public health administration, wherever such administrations may be established.

And finally another thought occurs.

Medical services, wherever located, are essentially fighting organizations, engaged in combating insanitary conditions, in raising defences against the invasion of disease, and in attempting to stave off the approaches of death. In common with all fighting services, the success of their operations in the field is largely dependent upon the efficiency of the intelligence services they have organized and direct. To justify their title and employment, these intelligence services must fulfil three fundamental requirements: they must be organized (*a*) for the *continuous assembly* of reliable facts, (*b*) arrangements must provide for the *rapid transmission* of such facts to the headquarters of the striking force, and (*c*) provision must be made for their *correct analysis and interpretation* being rapidly carried out, so that the information released thereby may be acted upon with promptitude.

---

* See *Studies of Tuberculosis among African Natives.* Reports to the Medical Research Council by S. M. Burrows, R. J. Matthews, and C. Wilcocks, edited by Professor S. Lyle Cummins, *Tubercle* Supplement, January 1935.

These requirements are widely realized in the Colonial Medical Service, even though at times officers in the field do not appear to exploit to the full their opportunities, and responsible authorities at Headquarters may not always seem to appreciate the importance of what has been, or might be, accomplished. This is inevitable in any Service staffed by men and not angels. If the scientific public, and indeed the public in general, could be stirred to take an intelligent interest in the work, and be brought to appreciate the difficulties facing those engaged in building up in the British Colonial Possessions accurate systems of vital and medical statistics, there is little doubt that such encouragement would greatly accelerate progress in this important field of work.

A knowledge of the commercial possibilities in the Colonies is not more important than a knowledge of hygienic possibilities; it is less important, for without detailed sanitary knowledge commercial development in many areas must be precarious and costly in the face of unrealized menaces to health and life. But the news value of Colonial Trade Statistics is, at present, far greater than that of Colonial Vital Statistics.

Our Society, which has done so much pioneer work in the education of statesmen and publicists, has here another golden opportunity.

References.

Official Publications include:—

Annual Medical and Sanitary Reports relating to fifty-six territories for the year 1934.

The Dominions and Colonial Office List, 1935. Waterlow & Sons, Ltd., London.

Tropical Diseases Supplement, 1935 and 1936. Bureau of Hygiene and Tropical Diseases.

Health and Progress of Native Populations in certain parts of the Empire, H.M. Stationery Office, 1931.

Census of India, 1931. Vols. I and V.

The Malaria Epidemic in Ceylon, 1934–35, by R. Briercliffe. Sessional Paper XXV. Columbo, 1935.

Decrease of the Native Population of Fiji. Report of 1896.

An Economic Survey of the Colonial Empire. H.M. Stationery Office, 1934.
Financial and Economic Situation of Swaziland. H.M. Stationery Office, 1932.
Financial and Economic Position of Basutoland. H.M. Stationery Office, 1935.
Financial and Economic Position of the Bechuanaland Protectorate. H.M. Stationery Office, 1933.
Report of the Kenya Land Commission. H.M. Stationery Office, 1934.
Government Gazette, Nyasaland, October 1936. Government Printer, Zomba, Nyasaland, 1936.
Report of the Committee appointed to enquire into Emigrant Labour, Nyasaland. Government Printer, Zomba, Nyasaland, 1936.
Various Official Handbooks relating to the several Colonies, published by Crown Agents for the Colonies.
Economic Conditions in the British West Indies. H.M. Stationery Office, 1935.
British Guiana—Annual Colonial Reports, No. 1765. H.M. Stationery Office, 1936.
Report on Financial and Economic Conditions in British Guiana. H.M. Stationery Office, 1931.
British Honduras—Annual Colonial Reports, No. 1764. H.M. Stationery Office, 1936.
British Honduras. Financial and Economic Position. H.M. Stationery Office, 1934.

Non-Official Publications include :—
Manson's Tropical Diseases, edited by P. H. Manson-Bahr. 10th Edition. Cassell & Co., London. 1935.
The Colonial Service, by Sir A. Bertram. Cambridge, 1930.
La Répartition de la race humaine, by E. Levasseur, *Bull. de l'instit. internat. de Statistique,* Vol. XVIII.
Pagan Tribes of Borneo, by C. Hose and W. McDougall. 2 vols. Macmillan, London, 1912.
Pagan Races of Malaya, by W. Skeat. 2 vols. Macmillan, London, 1906.
The Fellāhīn of Upper Egypt, by W. S. Blackmore. Harrap, London, 1927.
Melanesians and Polynesians, by G. Brown. Macmillan, London, 1910.
An Enquiry into the Dietaries of the Hausas and Town Fulani of Northern Nigeria, McCulloch, *West African Medical Journal,* Vol. III, July 1929–Jan. 1930.
Notes on Infant Mortality in the Colony of Lagos, Nigeria, D. Whitbourne, *West African Medical Journal,* Vol. IV, July 1930.
Marriage and Childbirth among the Kanuri, R. E. Ellison, *Africa,* Vol. IX, No. 4, pp. 533–5, 1936.
Studies of Tuberculosis among African Natives, Tubercle, Supplement, January 1935.
Frambœsia Tropica, by E. H. Hermans. Leyden, 1931.
Native Races and their Rulers, by C. L. Temple, 1918.
Bantu Beliefs and Magic, by C. W. Hobley, 1922.
Medical Practice in Africa and the East, by J. Howard Cook, 1923.
Twenty-five Years in East Africa, by John Roscoe. Cambridge, 1921.
The Muruts of North Borneo (Malaria and Racial Extinction), A. J. Copeland, *Lancet,* 25th May, 1935.
Safeguards in the Publicity Use of Vital Statistics, A. W. Hedrich, *American Jour. Pub. Health,* Vol. 24, April 1934.
Tribal Studies in Nigeria, by C. K. Meek. London, 1931.
Religion, Folklore, and Customs in North Borneo and the Malay Peninsula, by I. H. N. Evans. Cambridge, 1923.
The British West Indies, by A. E. Aspinall. London, 1912.
Africa View, by Julian Huxley. London, 1931.
The Peoples of South Nigeria, by P. Amaury Talbot. Oxford Univ. Press, 1926.
British Malaya, by Sir Frank Swettenham. London, 1929.

The Improvement of Native Agriculture in relation to Population and Public Health, by Sir A. Daniel Hall. Health Clark Lectures, 1935. Oxford Univ. Press, 1936.

Vital Records in the Tropics, by P. Granville Edge. London, 1932.

The Scope and Uses of Vital Records in the Tropics, P. Granville Edge, *Proc. Roy. Soc. Med.* (Section of Tropical Diseases), Vol. XXIV, July 1931.

Strange Places and Strange Peoples, by Sir Reginald St.-Johnston. London, 1936.

Researches in Polynesia and Melanesia, by P. A. Buxton. Parts I–IV. Published by the London School of Hygiene and Tropical Medicine, 1927.

Researches in the Western Pacific. by F. W. O'Connor. Research Memoirs of the London School of Tropical Medicine, Vol. IV, 1923.

Discussion on Major Edge's Paper

Professor Greenwood: It is common form in opening a discussion to refer to the importance of the subject, but it is not necessary to remind this audience of the importance of vital statistics. Then, again, if not precisely common form, it is at least a tradition of our Society for the mover of a vote of thanks to spend much of his time explaining how much better the paper might have been had its author gone to work in a wholly different way. Here, again, I shall not follow tradition. It is probably true that if I had been writing the paper, it would have been written differently: I fear it might not have been written at all, because, having scented the hare started in the last paragraph of page 199, I should have become too excited in the chase of a possible explanation, statistical or material, of these discrepancies, to remember that I was writing a general paper. Unless there is some difference in mere book-keeping, it ought to be possible to do more than guess at the causes of these contrasts in rates of infant mortality. Major Edge's purpose, however, was not to solve problems, but to call attention to the fact that there are problems that have to be solved, and that will not be solved until people are interested in solving them. One of Major Edge's main theses is that the home public, even those who are quite genuinely interested in and well informed about some aspects of colonial affairs, regard vital and medical statistics with indifference.

I am a desultory reader, and during the vacation was turning over the Historical Manuscripts Commission's report on the Bathurst Manuscripts. My eye was caught by a letter from a Mr. J. Clarke to Viscount Castlereagh, dated June 22nd, 1807. It will be recollected that at that time the abolition of slavery was a political issue and the economic consequences were beginning to be discussed. Mr. Clarke had, it appeared, been requested to commit to paper his observations on St. Domingo, and here is one of them: "Formerly, in that part of St. Domingo that belonged to his Most Christian Majesty, the population amounted to 500,000 slaves, 45,000 men of colour, and 22,000 whites, and as the deaths far exceeded the births amongst the slaves, it required the annual importation of more than 80,000 Africans to keep up that number of 500,000 slaves necessary for the cultivation of the island" (Bathurst MSS., p. 61). If Mr. Clarke had been intelligently interested in vital statistics, it would have occurred to him that this was a very remarkable result. It implied a rate of mortality only about 20 per cent. short of the mortality in London in the year 1665, when of some 500,000 people, about 97,000 died. It may be said that people were not much interested in vital statistics one hundred years ago in England.

I have recently read the third instalment (published in 1936) of a considerable treatise on the British Sugar Colonies by Dr. W. L. Mathieson—*The Sugar Colonies and Governor Eyre* (London, Longmans, 1936), Dr. Mathieson makes few excursions into the vital statistical field, but here is one. He is speaking of the condition of Antigua after emancipation and writes: "The census of 1851 was considered so disquieting that another and more accurate enumeration was made in 1855; and it was then disclosed that more than one-fifth of the deaths, apart from still-born children, were of infants under one year." From the wording of this sentence I think we may reasonably infer that Dr. Mathieson thinks a proportion of one-fifth of the deaths falling on children under one year evidence of some peculiar insalubrity in Antigua, and that it is a most staggering condition. But in all decennia down to and including 1901–10 the proportion of deaths under one, in England and Wales, was more than one-fifth. In 1861–70 it was 24·1 per cent. and in 1901–10, 22·6 per cent., and even in 1911–20, as much as 15·7 per cent. In fact, this earnest and diligent student of colonial history is not really interested in vital statistics. It is this lack of interest which is serious. As Major Edge has pointed out, we do not lack colonial officers who are both interested and competent. Why should they lack—as they most certainly do—encouragement and sympathy from fellow-citizens at home?

I am a teacher of medical statistics, and I have in some slovenly kind of way to survey the world from China to Peru. I am not, I hope, an extreme nationalist, but I confess to a certain patriotic discomfort when I compare the writings of the Dutch on colonial vital and medical statistics, with those of my fellow-countrymen. I must, of course, make allowance for a psychological bias. We all over-estimate the importance of knowledge which we acquire with difficulty and few other people acquire at all. I read Dutch with difficulty and a dictionary, in detestably small print, at my side, and few of my colleagues seem to read it at all. Therefore I may over-estimate the value of information laboriously acquired. Yet, having read with care a number of reports and monographs dealing with the medical statistics of Sumatra, and being an occasional student of *Geneeskundig Tijdschrift voor Nederlandsch-Indie*, I do ask myself whether there are any English colonial publications, official or non-official, in which similar care for, and interest in, medical and vital statistical work are displayed. In the volume of the *Tijdschrift* which I happened to have beside me when I was making notes for this discussion—the volume for 1934—there was appearing, as a serial, a history of public health in the Dutch Indies during the nineteenth century, by Dr. D. Schoute. It is a most detailed study, which must have involved laborious research in the archives, and, whenever he can do so, the author provides statistical information, particularly with respect to hospital patients and accommodation. I ask myself whether *any* English journal would undertake such a publication.

Then the reports to which I have referred upon the Sumatra plantations provide statistical information respecting the morbidity and mortality of the coolies, almost comparable in extent and apparent accuracy with the occupational mortality and morbidity data of a European state. Time does not permit any detailed examination of this work—I will give in the printed report some references to English abstracts *—but, even at the risk of exceeding the time limit, I do not like to leave it in the vagueness of mere laudation. I would take as an example such a monograph as that of Dr. Straub on infant mortality in Sumatra, published by the Netherlands Colonial Institute so long ago as 1928. I suppose in most tropical colonial possessions there have been three stages of development. At first, labour is abundant and cheap and no sense of moral responsibility has emerged; next, partly for commercial, partly for ethical reasons, some thought is given to the hygienic conditions of adult labourers; finally, when the coolie population includes a considerable proportion of women and children, the whole hygienic situation is faced. I have no reason whatever to suppose that Englishmen are less sensitive to such motives than the Dutch, but the latter, as typified by Dr. Straub, make more use of the statistical method in tackling the problems which arise. In this book there is a statistical study of the infant mortality in the coolie population of numerous commercial establishments on the east coast of Sumatra, showing rates ranging, on reasonably large samples, from 370 to 80 per 1000, and there is a careful analysis of the possible causes. Reason is given for believing that that fashionable factor, nutrition, the nutritional level of the adult female, is of major importance. Thus, among the employees of two similarly housed sections of the same company, the infant mortality rates were 190 and 280: in the section with lower mortality the ante-natal care was better, and a majority of births took place in a lying-in institution. But an equally important factor was domestic housing. In one company the rate was 160 per 1000, in another 280; but the only discoverable difference was that the employees of the former were housed in separate huts, and those of the latter in barracks. Indeed, it seemed that hovels were to be preferred before admirably constructed blocks of what we should perhaps call flats, owing to the spread of infection from one family group to another. Dr. Straub, in this connection, referred to the analogy between his conclusions and those of Topley and myself, respecting herds of mice—the first and last time that experimental epidemiology has received any attention in colonial reports.

Whether Dr. Straub's final conclusions are or are not correct, I need not discuss. I merely wish to illustrate a method of approach which differs, greatly for the better, from our own average. I do not infer from this that the colonial officials of Holland are naturally better endowed for, or even more interested in, statistical study than ours. I think that their work is more valued by their countrymen at home. Perhaps—and this is a mere speculation—a small nation with a great overseas Empire thinks more about it, and is really prouder of it, than our larger population is of the British overseas possessions.

---

* *Bulletin of Hygiene*, III, 921, V, 266, VI, 730, 871, VII, 559, VIII, 403, X, 151.

Of this at least I am convinced, that our cold indifference to the vital statistical study of British possessions beyond the seas is a great evil. I hope that the paper read to-day may mark the beginning of a new era. It was not within the scope of Major Edge's undertaking to attempt the solution of any specific problem. He has given us an outline drawing or—to take a metaphor more suited to the mouth of a teacher—he has given us a syllabus rather than a lecture. Perhaps he will stimulate younger men to fill in the outline or to lecture from the syllabus. Certainly the report of this meeting in our *Journal* will convince men working far away and under difficulties that at least some of us are not indifferent to their labours. Perhaps the day may even come when the statistics of human lives and deaths across the seas may seriously compete in news value with statistics of rubber production and other merchandise.

I have the greatest pleasure in moving a vote of thanks to the author of the paper.

Dr. R. R. Kuczynski: I have great pleasure in seconding the motion of a vote of thanks to Major Edge.

In his excellent paper he pointed out some of the difficulties encountered in the collection of census and vital statistics: the suspicion of the natives that a census is the prelude to some new form of taxation; their superstitious fear of counting; the unpopularity of the registration of births because of the apparently useless expense of money and time involved in travelling to the registration centre. As to the suspicion that the census will serve fiscal purposes, it is only too well justified in many colonies and mandated territories, since the main purpose of the census there is actually to obtain a basis for levying the capitation tax. The superstitious fear against counting might be overcome by the co-operation with the native priest or medicine-man advocated by Major Edge, by the employment of local ex-pupils of Government schools as enumerators, and by similar measures. Inasmuch as the reluctance to report births, etc., is due to the trouble involved in a long journey to the registration centre, the only possible remedy is to establish a larger number of registration centres.

But all these, I think, are minor difficulties. Major difficulties are, for example, the inadequate topographical knowledge of the authorities and the inadequacy of the funds granted for census purposes. As long as the authorities do not know all the places where natives live, the census is bound to be incomplete, and to-day, when aeroplanes have so much lightened the task of making topographical surveys, there is little excuse for not giving the enumerators a complete list of the places to be visited. But even with perfect willingness of the natives to be enumerated and perfect knowledge of the places where the natives live, the authorities would not be in a position to take an adequate census without having adequate funds at their disposal. Nigeria has about half the population but over five times the area of England. Yet the administration of Nigeria is supposed to take a census at 1 or 2 per cent. of the cost of a census in England. To increase the expense for the next Nigerian census by 50 per cent. might be a waste of money, but to increase it by 5000 per cent. might be a good investment.

Major Edge, in his most valuable annual Supplement to the *Tropical Diseases Bulletin*, shows that in most colonies the inadequacy of the health service is due to the inadequacy of the funds provided for this service. We should all, I am sure, appreciate it if in his concluding remarks he would say a word about the financial aspect of the Demography of British Colonial Possessions.

SIR ERNEST GRAHAM-LITTLE said he felt he had no right to appear before such an audience but, like the President, he had become excited some years ago at some figures which he came across on the incidence of disease in Kenya, and for the last four or five years he had become more and more excited by that contemplation.

The position in Kenya was rather interesting, because it had been investigated by a quite remarkable body of medical observers, and although he knew that medical observers were not regarded with favour by statisticians, and their statistics as a rule were not entirely complete, he would like to plead for more consideration of medical statistics, as being honestly acquired and made with knowledge by persons who were deeply interested in the subject.

The first paper that came across his vision was an extraordinarily interesting publication by the Medical Research Council in 1931. A Medical Research Council publication seldom went beyond a small circle, and no notice was taken of that contribution produced by Sir John Orr, who had made since that date an outstanding reputation, and by the Director of Medical Services in Kenya. Two very important and interesting facts emerged from that observation, which further summarized an accumulation of previous reports, prepared in a masterly way. They examined two tribes, one of 900,000, one of 45,000 units, occupying adjacent districts. The smaller tribe, the Masai, lived on a simple diet; they were a pastoral people, ate flesh, and drew blood from the veins of the cattle and drank it fresh; they also consumed quantities of milk, but very little cereals. This diet contrasted with that of the Kikuyu, the larger tribe, who were an agricultural people, for whom milk and meat were practically unobtainable. The Masai were very warlike, and went through the neighbouring tribes like a knife through butter; the average adult male showed physical strength 50 per cent. greater; height 5 in. taller; weight 23 lbs. more than the average Kikuyu male. What was much more important was that their resistance to infective disease was incomparably greater than that of the Kikuyu.

The next report he had come across was contributed by his old friend and colleague Dr. J. H. Sequira, who had for the past eight or ten years lived in Kenya. He became intensely interested in the country, and began looking about for information, and on coming on a visit to England in 1932, he had given an interesting lecture on his own observations in Kenya. He showed that malaria was to be found in 95 per cent. of the children under ten years of age in large parts of the reserves, that yaws was practically universal, that venereal diseases were not at all infrequent, and that hookworm infection was present in 75–80 per cent. Infantile mortality was 40–50 per cent., as compared with 5·9 per cent.—the present figure in England. The physical incapacity of the native was simply deplorable.

Orr and Gilks had taken a sample of 650 in a trial survey of natives, and the incidence of disease which they found in that sample was very remarkable. They found something like 3000 diseases to be divided among 650 people, which meant that each individual had considerably more than one disease. As one of the observers wrote, the "native was an ambulant pathological museum of disease."

Sir Ernest said that in 1933 Dr. H. L. Gordon, a physician to a great mental Hospital in Nairobi, asked him to get him a hearing in the House of Commons, and he managed to arrange this. The present Colonial Secretary was in the Chair, and Dr. Gordon gave an exceedingly interesting account of his own individual researches. He had examined postmortem the brains of 100 normal natives in co-operation with a well-known pathologist, Vint, and they had made a close and scientific observation, the results of which were given at that Meeting and were published in *The Times* a few days later. This was followed in 1934 by a resolution of the combined branches of the British Medical Association in East Africa, which asked for an enquiry into the causes of native backwardness in Africa. It was urged that the investigation should be undertaken at once, since as the observers were on the spot the expenses would be relatively trivial, the local estimate being about £50,000.

That was followed by a correspondence in *The Times*, in the autumn of 1934, Sir Ernest having written a letter asking the Colonial Office to find money for the purpose. The importance of the enquiry was recognized by the Colonial Office, and several very important authorities wrote letters showing the vital necessity of getting really adequate information about the conditions existing in these backward places, but nothing was in fact done. In July 1935 he had asked a question, appealing for funds, and received the usual non-committal reply that there were no funds. Sir Ernest had pressed the matter further by Parliamentary questions in 1935 and 1936, and the position at present was that everyone recognized the importance of doing something about this, but no one saw how to get the necessary money and it was the money which was of first importance in initiating the enquiry.

Sir Ernest said he would like to point out quite a new aspect of this question of the treatment of backward races under the control of the British Empire. It was becoming extraordinarily important as a national question, because if the British were slack in their trusteeship of backward races other nations would undertake the job, and if a good show were not put up by us, it was fair that others should be allowed to do so. As a South African, he would deplore the advent of Germany into any part of Africa, but it would be necessary for Britain to take much more active steps to keep her end up, if we wished to prevent that occupation.

Two interesting reports had been made in the last twelve months. The first, by the Nyasaland Government, contained a passage which was reproduced in a letter in *The Times* (16th Sept., 1936) by Lord Noel-Buxton, and which stated that the natives in Africa, and especially in East Africa, were acquiring a complete mistrust in and loathing for administration by white people because of the conditions prevailing in Africa at the present time; the report showed that every year 60 per cent. of the able-bodied males were migrating from Nyasaland because they could not pay the hut tax, an examination of the conditions in a certain district showed that the tax collected was pounds more than the total of wages paid plus the yield of crops. Money was being sent into the country by these wretched exiled natives from parts outside Nyasaland to pay the hut taxes levied in their own country. That was a scandalous state of affairs, and if it became more widely known it would have a bad effect on our prestige. A similar position was apparent from the recently published Pim report on Kenya which condemned the hut tax. Sir Ernest stated that he had been told by the Director of Medical Services in Kenya, three years ago, that the Government could seldom get the hut tax paid, and inasmuch as the net income of a native family was about £3, and the hut tax was 12*s.* 6*d.*, the difficulty of payment was obvious.

Sir Ernest hoped that one result of this admirable paper would be an increased realization of the responsibility of the Home Government for conditions which one could not but deprecate as existing in a large part of Central Africa.

Dr. Balfour Kirk felt himself to be an interloper at the meeting, almost a parasite who had lived at the expense of his very charming hosts that afternoon. The host and parasite relationship was a very important one in the tropics, as had been pointed out by various speakers. One of the main difficulties in trying to assess the fitness of the population was the fact that the average inhabitant of those countries, who was living on a very low economic plane, was carrying about with him probably two and possibly more parasites of different kinds. In his blood he might have malaria, although it was not upsetting him to any great extent, and in his intestines he had almost certainly got two parasitic helminths to keep him company through life.

As one whose primary job it was to try to work with statistics from their collection to their interpretation, he thought that a good deal of the former neglect of statistics had been largely due to the sort of bogey which had been raised in the minds of simple people like himself by the statistical experts. They generally raised a kind of mathematical smoke-screen in front of their deliberations, and the average man shivered with fright whenever he attempted to understand one of their papers. He did not think colonial statistics had merited such treatment, so far, and he really did think that that type of thing, appearing in various statistical journals, as well as some of the criticism which had been made, in ignorance of the economic and the personal background, of the unfortunate man who had to do the work overseas with only his head, hands and eyes, trying to learn something about the people and to put it on record, was responsible, by their discouragement, for the former poor quality of the colonial statistical records. The statistical results of the man on the spot might have been meagre, but his resources were probably meagre, and occasionally it might have happened that the damning of his paper by faint praise, if not the damning of it outright, might have discouraged him from continuing work which might have quite reasonable value for people who understood what the background was, what were the limits of the man's work, and what reservations had to be put on his conclusions. Most medical men working in the tropics now were beginning to treat vital statistics with a certain degree of familiarity, which was improving their quality; they were encouraging their junior staffs to send in their own reports, but as the British Colonial Empire was composed of a vast number of units which were entirely different one from the other, one could not as yet expect to get uniformity of procedure or results.

In Mauritius, which had been in European occupation since the late eighteenth century, the statistics were fairly complete so far as the actual crude numbers were concerned; the birth and death rates were fairly good, the census was reasonably accurate, but when it came to the grouping of causes of death there was difficulty, for the simple reason that so many of the causes of the deaths given were symptomatic. Most people in the tropics when they were dying had either bronchitis or diarrhœa, so dysentery and pneumonia tended to appear rather more often than they should. In the same way, if this prevailing attack of influenza had occurred in Mauritius during the malaria season, undoubtedly the first series of cases would have been recorded as malaria, until someone woke up to the fact that it was influenza. The tendency in colonial statistics was to over-record the common things and to under-record the unusual. At the same time, most men in the Colonial Service, now having penetrated the mathematical smoke-screen raised by the professional statisticians, were beginning to realize that vital statistics could be extraordinarily interesting to them, and were not so terrifying after all. Judging by recent colonial reports and by his own experience, he felt that men were now trying to give the social and economic background, and although their own interpretation of the figures might sometimes seem rather fantastic, it might be taken to be a fairly intelligent guess at the truth. It was very gratifying to him to attend the meeting and to realize that the subject of colonial vital statistics was at last receiving its bit of recognition in the home country. There was nothing that stimulated a man more when he had done this work than to think, "Thank goodness, someone is going to read it." One so often felt that the reports were relegated to official files. So far as the Royal Statistical Society was concerned, he felt that the opportunity it had afforded for this discussion would be the cause of a revival of interest in this subject, and of still greater improvement in the presentation of the relevant data.

LORD KENNET expressed his interest in the paper, and in the stimulating discussion which it had provoked. The excellence of a paper might be measured by the excellence of the discussion, and this interesting discussion was a tribute to the paper.

All seemed to agree on the unsatisfactory nature of colonial statistics. Many causes had been pointed out, and he would refer to one more—the totally irrational geographical character of the units of colonial administration. The units of administration, Colonies, Protectorates and so on, had sprung up by the accidents of history, without the least reference to the interests of scientific government. If there was advantage to be reaped from the unifying forces of Empire, it was the rationalization of those units. The administration could never be placed upon a rational basis until the geographical areas were also rationalized.

In Eastern Africa, for instance, the frontiers of Kenya and Tanganyika had absolutely no reference to any fact in nature, geography, economics or anthropology. Similarly, in Central Africa the frontiers between North and South Rhodesia had no justification on any rational basis. How was it possible to collect vital statistics rationally until there were rationalized areas for their collection? It was much too much to expect any basic recast of political areas, but what could be done with ease by the forces of Imperial control, was the establishment of a unified organization for collecting statistical information: and there were innumerable other common interests which could be unified, co-ordinated, and rationalized with advantage.

Another consideration was emphasized by Dr. Balfour Kirk in his well-informed speech. The officials of small Colonies could not be expected to have the highly special and expert knowledge which was necessary for such purposes as those which were in the mind of the reader of the paper; they were fully occupied with other tasks. Nor was it possible, with the amount of money at their disposal, to place a statistical expert in every little Colony. But it was possible to improve the Empire's general Staff in Whitehall by having there available experts who had studied the needs of the Colonies and who could bring to bear the knowledge necessary to enable the colonial officials themselves efficiently to perform their statistical tasks.

He had pleasure in putting the vote of thanks to the reader of the paper to the meeting.

(The vote of thanks was carried unanimously.)

The following communication was received after the meeting from SIR RICKARD CHRISTOPHERS, C.I.E., M.B., Ch.B., F.R.S., who was unable to remain for the discussion:—

I should like to support Major Edge in emphasizing the importance of vital statistics to public health work among indigenous populations in our tropical possessions. In India vital statistics, in so far as they relate to the actual record of births and deaths, are believed to be at least approximately accurate. Death returns for the 40 millions or so inhabitants of the Punjab are believed to be accurate as to fact of death to within 5 per cent. This result has been due to the great importance that was attached in India some decades back to the collection of vital statistics. I have received the impression that greater attention was given to such matters many years ago, when the Census and the importance of vital statistics were a new interest, than perhaps at present when there is a danger of our being somewhat *blasé* in this respect. At any rate I believe it is true, judging from medical literature, that less effective arrangements exist in some of our newer colonies in the tropics than in India, where a valuable legacy from efforts in this direction has been handed down to us from the past.

Accuracy of the Indian vital statistics does not, of course, apply to "cause" of death as given in the returns. Actually, however, the fact of death and the cause of death are two quite different things. Failure to appreciate this has often led, I think, to some confusion of thought as to the value of vital statistics in the tropics. One frequently hears such statistics condemned as being utterly valueless. Such an opinion will usually be found, however, to be based on disbelief in the correctness of the returns for "cause" of death. It is probably too much to hope that "cause" of death can ever, under existing conditions in large indigenous populations, be more than at most a guide (to be used along with information from dispensaries and hospitals) to the interpretation of the graph for total deaths. I have always found in my own experience that it is the graph of total deaths which provides the only sound basis for scientific study, just as from a seismographic tracing it is possible by legitimate scientific methods to learn much about the earth's crust. Where large indigenous tropical populations are living under somewhat primitive conditions, the major diseases, and especially the major epidemic diseases, imprint their effects often strikingly on the total death curve, which must be studied not alone in massed figures, but in those for numerous small unit areas. In India such methods have been found to be extraordinarily valuable. Thus not only has it been found possible to reconstruct past epidemics and their exact distribution, and thus to learn much regarding the diseases causing them, but even to give forecasts of great value to the public health authorities as to impending epidemics. As a result of my own researches in India I can well see how Major Edge, in talking of our tropical colonies, has come to emphasize the need for vital statistics and their study.

MAJOR P. GRANVILLE EDGE in reply said: I thank you most warmly for the very kind reception you have given to this paper of mine, and for the patient interest you have shown towards the reading of what must have proved a tiresomely long essay. I am especially grateful to the proposer and seconder of the vote of thanks for the kind things they have said, and for the generous references made by later speakers during the course of the discussion, despite the many shortcomings which characterize the paper. It is most encouraging to find so considerable an interest taken in matters concerning our Colonial Possessions.

As the hour is rather late, I shall fall back upon the time-honoured excuse that to reply at length to various queries raised by speakers would scarcely be practicable, but perhaps I may be allowed briefly to refer to one or two points before we disperse.

Professor Greenwood has called attention to the excellence of the Dutch Colonial Statistics, and during the course of his remarks commented upon the differences noticeable between their data and those to be found in British Colonial Reports. Some of the differences of recorded experience appearing in our Colonial Reports received brief attention during the course of my address, but a notable feature characterizing the Dutch Reports is that their reporting officials endeavour to explain the *causes* underlying unusual experiences noted. By comparison it may be observed that though in our Colonial Reports differences may be presented in the form of numerical assessments, too rarely is a textual commentary supplied evidencing a determination to get behind the figures in an endeavour to explain the *Whys*; this tendency persists year after year in some areas—a mere purposeless repetition of old methods of work. For example, in one Colony, where the average annual deaths due to *malaria* run to 700 or 800, there are about twenty times as many deaths each year ascribed to "*unspecified fevers*"; it seems to be the business of no one to enquire into the causes giving rise to such a large number of deaths appearing under a vague title, or to introduce reforms which shall ensure the presentation of more precise information concerning these deaths.

Dr. Kuczynski spoke of the necessity of increasing the numbers of registration centres in the Colonies; the difficulty of giving effect to such proposals was adequately dealt with by the President during the course of his remarks —it is a question of money, inadequacy of funds making any considerable expansion impossible. Almost everywhere it may be said that the Colonial Medical Services are under-staffed. In one territory which occurs to mind, a territory with upwards of a million and a half of people, there are something like thirty European Medical Officers, and it is these overworked officials who are largely responsible for the assembly of the kind of data we are discussing. The question of increasing such small staffs is a question of revenue; if the money is not forthcoming, obviously additional staffs cannot be appointed.

Sir Ernest Graham-Little spoke of Kenya experiences, and referred at some length to the Report of Gilks and Orr of the important work done by Sequeira, and of the valuable data assembled in the course of special small-scale investigations. But, as I explained in my paper, my survey was confined to consideration of the data appearing in Colonial Medical Reports, and for a specified year only. It is perfectly true that the data resulting from special and limited investigations are of first-rate importance; I have shown that in one Colony where only four cases of *schistosomiasis* appeared in the Annual Report, a small-scale enquiry indicated that approximately 52 per cent. of the total population showed clinical signs of the disease. For financial or other reasons, however, it is not always possible for the authorities to engage in such research enquiries.

I conclude by again thanking you most heartily for your patient attention and for the kind reception you have given my very modest effort.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society :—

John Edmondson Almond.
Leslie John Comrie, M.A., Ph.D.
Harold Harman.
Joseph Guest Ledwidge.

Corporate representative.

Charles Garratt Garratt-Holden, B.A., M.Com., *representing the* Building Societies Association.

SOME SCANDINAVIAN STATISTICS.

FRAGMENTS FROM A NOTE-BOOK.

By SIR ALFRED W. FLUX, C.B., Ll.D.

[Read before the ROYAL STATISTICAL SOCIETY, February 16th, 1937, the PRESIDENT, LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C., in the Chair.]

THE paper which is presented to you this evening has its origin in a suggestion of the Society's Executive Committee. The selection, from the wide range of Scandinavian statistics, of those particular branches likely to have special interest for our Society, has been made on my own sole responsibility. Naturally, the different groups of Economic Statistics have exercised the greatest attraction on me, as it was in that field that I did my earliest work, and in which the period of my official life was spent. In addition, the International Committee that is engaged in the performance of certain tasks prescribed by the Convention of December, 1928, relating to Economic Statistics, in whose work I have had the honour to share from its commencement, has tended to prevent my thoughts from wandering too far from the long-familiar topics. It will therefore not surprise you that my selections for this evening are made from the field of work with which earlier contributions to the proceedings of this Society have been concerned. The mathematical work of Swedish writers to which Professor Greenwood, in his valedictory address last year, called your attention, will occupy no part of what I am putting before you. It is not for lack of appreciation of the work in that field that I propose to omit any further reference to it, but that the improvement of the raw material, the analysis of which gains so much from the advances in its mathematical treatment, still seems to me to have an importance by no means inferior to that of the further improvement of the analytical devices. In both fields Scandinavian workers have won well-deserved recognition.

At the outset I would make it clear that, for my purposes this evening, Scandinavian statistics will mean those of the three countries Sweden, Denmark and Norway. The periodic gatherings for consultative purposes of the chiefs of the official statistics in these countries with their colleagues from Iceland and, more recently, also from Finland, would naturally give a wider significance to the epithet "Scandinavian." Having no claim to more than quite superficial knowledge of the work of the last-named two countries in the field of statistics, I do not propose to attempt any statement about it on this occasion. The gatherings to which I have alluded are, however, worth somewhat particular notice. They commenced as far back as the year 1889, and, though they have not resulted in anything like uniformity in the treatment of statistical material, differences in which follow the contrasts in natural conditions and resources of the different countries, they have had the effect of keeping the participators in these gatherings informed regarding the work of their neighbours, and have resulted in marked tendencies towards a measure of similarity in the grouping of statistical data, and in the handling of statistical problems.

Statistics of Foreign Trade.

In the statistics of external trade, the proceedings of the sixteenth of the conferences of the Northern official statisticians, held in May of last year, show that, while divergencies in practice in matters that had settled down to a uniform routine were cropping up, the tendencies to a common outlook did not appear to have become weaker.

The basing of the valuations of the goods imported and exported on declarations required from the merchants concerned, relating to the goods at the passing of the frontier—that is, c.i.f. for imports and f.o.b. for exports—is now common to all the three countries we are considering. The last remnant of the use of "official" values disappeared only in 1932, when Norway, having used declared values for exports for a decade, introduced that basis for the valuation of its imports as well.

In the allocation of trade to the countries with which it is carried on, the practice of the Scandinavian countries has been to record the countries with which the immediate financial settlement in respect of the purchase of imports or sale of exports took place. This exceptional basis of record would appear likely to create in the resulting figures a degree of lack of comparability with the corresponding records of other countries, whether these record the countries from and to which the goods are consigned by, or on account of, the last owner, or, as in other cases, the countries in which imported goods were produced (or transformed), and the countries in which exported goods are to be consumed (or transformed). For comparison of these three countries with one another, the basis doubtless had its advantages, and the balance of immediate financial transactions has an importance, whether it represents the physical in and out movements of goods in the period concerned or not. It has not facilitated comparability of the international records of trade between countries and, in the phase of international trading relations that has developed since the war, its inconveniences appear to have been prominent in contrast with its advantages. The attention directed to this subject in the discussions at Geneva in November-December, 1928, and the attempts that followed that conference to approach a common view in this matter, have produced important reactions in the Scandinavian group. In the official record of the trade of Norway in 1935, the figures for that year are grouped by countries of origin and consumption (use) as well as by those of purchase and sale, and those particulars of destinations that appear in the monthly accounts of Trade in respect of selected classes of exports have, during 1936, related to countries of use or consumption, while the *Statistiske Meddelelser* have given the full double record for both Exports and Imports. For Sweden the published data for 1936 have shown countries of purchase and sale, but countries of origin and consumption will, in addition, be published with the annual figures, and the double record is to be maintained for a period of five years. In what way the Danish statistics will be brought into line has not yet been announced, but the instructions given to a Committee of representatives of the three countries, set up to study the question, included a reference to a possible supplementary publication of the particulars of countries of origin and consumption (use). The importance of comparability with the records of 1931 trade in connection with exchange control is a hindrance to change.

In the meantime, the Danish report on the trade of 1935 has included a summary of particulars (a request for which was made on behalf of the Statistical Committee referred to earlier) relating to the countries of origin of the imported goods covered by 35 important headings in the new international nomenclature, prepared by the Committee for facilitating comparability in statistics of the trade between countries. The aggregate value of the imports, into Denmark in 1935, of the goods represented in this special compilation was somewhat more than 23 per cent. of the value of all imports recorded for that year. Of the total of 311·8 million kroner (£13·9 million), the purchases from the United Kingdom are shown as 87·2 million kroner (£3·9 million), but the goods produced in the United Kingdom amounted, in this aggregate, to only 23·7 million kroner (under £1·1 million) or about 27 per cent. of the amount "purchased" here. A similar proportion will not necessarily apply to the aggregate of all imports into Denmark purchased in the United Kingdom, which were recorded at 479 million kroner (£21·4 million). A reduction of about 30 per cent. would be needed in this amount to make it the equivalent of the recorded exports, from this country to Denmark, of goods produced in the United Kingdom, with transport charges to Danish ports. In the case of the Norwegian record, which shows the total imports from the United Kingdom in 1935 as 192 million kroner (£9·6 million) on the basis of purchases, but of only a little over 147 million kroner (£7·4 million) on the basis of goods originating in United Kingdom producing establishments,* the latter figure cannot be said to be in serious disagreement with the British record of exports of home-produced goods to Norway, when transport charges are added. When corresponding data of imports into Sweden, classified by countries of origin, are available in the near future, a reasonably close agreement between the United Kingdom record of goods despatched and the Swedish record of goods received, may be anticipated.

In the case of each of the three countries, the classification by countries of purchase assigns a high proportion of the imports to five countries—namely, the United Kingdom, Germany, the United States and the other two members of the Scandinavian group. In the case of Norway the proportion in the five years 1931–5 averaged 66 per cent., in Denmark 67 per cent. and in Sweden 68 per cent. The Norwegian record by countries of origin reduces the proportion obtained from these five sources to a fraction less than 60 per cent. in 1935, as compared with 66¼ per cent. by the older mode of allocation. How the impression of concentration of trade within a comparatively narrow range may be modified when data of imports by countries of origin become available for Sweden and Denmark as well as for Norway, it is not worth while to guess.

Index Figures of Price Movements of Imports and Exports.

In passing from the statistics of foreign trade, it may be noted that Denmark was the first country that published the classification of its imports and exports, by stage of production and by the uses for which they are adapted, on the lines proposed by the Committee of Statistical Experts. A couple of pages in the *Annual Trade Account* suffice for the various aggregates, and it is worth while, though not germane to the subject of this evening, to note that Poland has found room for corresponding data on a single page. The example thus given by these two countries may perhaps prove contagious. But while Poland agrees with Denmark in providing figures for 1934 as well as for 1935, Denmark has provided figures, not only for two, but for five consecutive years, and has, in addition, prepared, for each of the groups distinguished, a valuation of the 1935 totals of imports, and of exports, at the average values recorded for 1931 for goods comprised in these groups. Thus the change between 1931 and 1935 in the volume, as well as in the value, of the trade falling within the limits of each group is furnished, and the significance of the data has gained much as a result.

---

* For the year 1936 the corresponding (provisional) figures are: 225 million kroner for purchases in the United Kingdom, and 168 million for goods originating in the United Kingdom.

This question of price change, and its significance, should be considered in connection with the practice of presenting, with figures of wholesale price-index numbers, a segregation of the prices of "import goods," to which corresponding figures of "home-market goods" are frequently added, and an "export goods" index as well. The Danish practice is to give all three, the Norwegian to give the first two of them. When such a calculation as that recorded in the 1935 trade volume, carrying with it a measure of the proportionate effect of price variations on the trade aggregates, is made, comparison with the index of wholesale price change and its subsidiary indices of price change for goods imported or exported naturally follows. In the case in question, the calculation from the complete records of imports showed an excess of 17 per cent. when the trade of 1935 was stated in terms of the unit values of 1935, and of 16 per cent. when the trade of 1934 was similarly revalued, over the totals when stated in terms of the values of 1931. For exports the average values were shown as 19 per cent. in 1935 and 13 per cent. in 1934 above the 1931 basis.

The calculations of the price changes of those articles, selected from the material for the preparation of the wholesale price index, which reflected price changes in import and export goods had shown, for the former, an excess of 25 per cent. in 1934 and of 27 per cent. in 1935 over the figures for 1931, and, for the latter, excesses of 29 per cent. for 1934 and 41 per cent. for 1935. These figures bring out one of the weaknesses of the system of dealing with measures of price changes in the field of imports and exports as an incident in the procedure of measuring the average change in wholesale prices of commodities at large. So far as the material for calculating the index of change in wholesale prices embraces records relating to goods manufactured within the country from substances imported, with more or less of native substances added, a full and unbiased representation of price movements in imports will not be secured from the data of the wholesale price index. The corresponding weakness on the side of exports need not be elaborated, as the omission of the calculation of an "export goods" index in some cases in which an "import goods" index is presented—of which the Norwegian practice is, as already stated, an example—indicates a consciousness of the theoretical weakness of the export calculation.

While we are dealing with these figures, reference may be made to the yearly Swedish calculations of the value of the imports and exports of the elapsed year at the prices of the year preceding. The annual calculations made for many years by the *Economist* for

TABLE A.

Foreign Trade of Sweden.—Changes in Volume and in Average Values.

Year.	Imports.				Exports.				Wholesale Prices Indices.		
	Recorded Value. (Kr. '00,000.)	Estimated at Preceding Year's Prices. (Kr. '00,000.)	*Index Numbers.*		Recorded Value (Kr. '00,000.)	Estimated at Preceding Year's Prices. (Kr. '00,000.)	*Index Numbers.*		General.	Import Goods.	Export Goods.
			Quantities. (1929 = 100.)	Unit Values. (1929 = 100.)			Quantities. (1929 = 100.)	Unit Values. (1929 = 100.)	Board of Trade. (1913 = 71·4.)	Swedish Bank of Commerce. (1913 = 79·1.)	Swedish Bank of Commerce. (1913 = 69·4.)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1923	1,294·5		69·6	104·3	1,142·1		53·9	116·8	123·6	117·5	116·7
1924	1,424·5	1,416·8	76·2	104·8	1,261·0	1,360·8	64·3	108·3	115·7	112·7	106·9
1925	1,446·4	1,366·8	73·1	110·9	1,359·8	1,365·2	69·6	107·8	115·0	110·3	106·2
1926	1,489·8	1,586·8	80·2	104·2	1,419·5	1,441·7	73·8	106·2	106·4	111·9	104·9
1927	1,584·4	1,632·6	87·9	101·1	1,616·6	1,657·8	86·2	103·5	104·3	100·0	101·4
1928	1,708·0	1,717·9	95·3	100·5	1,574·7	1,594·9	85·0	102·2	105·7	101·6	102·1
1929	1,782·6	1,791·5	100·0	100·0	1,812·3	1,852·5	100·0	100·0	100·0	100·0	100·0
1930	1,662·2	1,831·7	102·8	90·7	1,550·4	1,665·6	91·9	93·1	87·1	80·2	93·1
1931	1,427·5	1,672·8	103·4	77·4	1,122·4	1,277·0	75·7	81·8	79·3	68·3	81·9
1932	1,154·9	1,091·1	79·0	82·0	947·4	997·7	67·3	77·7	77·9	74·6	75·7
1933	1,095·9	1,161·6	79·5	77·3	1,078·7	1,143·4	81·2	73·3	76·4	74·6	77·1
1934	1,304·7	1,297·1	94·1	77·8	1,302·4	1,260·7	94·9	75·7	81·4	76·2	82·6
1935	1,476·3	1,462·6	105·5	78·5	1,297·4	1,328·5	96·8	73·9	82·9	77·8	79·9
1936	1,619·4				1,504·4						

United Kingdom trade rendered the procedure familiar to students and others in this country. Table A shows the index figures for the years 1923–35 calculated from the Swedish data, arranged with the year 1929 as the year for which the volume of trade, and the average of prices, are taken as 100, so that comparison may be made with other indices on that basis, such as those that now appear in the *Statistical Year Book of the League of Nations.* For comparison, the General Price Index of the Swedish Board of Trade, and the price indices for Export Goods and for Import Goods published by the Swedish Handelsbank, all of which are calculated with 1913 as base year, have been multiplied by factors such as to make their values for 1929 equal to 100. It will be seen that there is by no means a close agreement between the different indices, taking as a whole the period covered, in spite of similarity at particular dates.

The contrast between the upward movement of prices for Danish imports and exports after 1931, expressed in the local currency, and the fall in and after 1931 shown by the data for Sweden, is somewhat striking. The fact that, after the abandonment in 1931 of the gold standard, following the action of this country, the Danish currency was further depreciated, in terms of sterling, at the end of January 1933, accounts for the major part of the divergence. The price of the pound sterling for most of the last four years has been 22·4 kroner in Copenhagen, 19·9 kroner in Oslo and 19·4 kroner in Stockholm, and the pre-war interchangeability, as equivalent units, of the currency units of the three countries, which then formed a mint-union, no longer simplifies comparisons of things expressed in monetary units in the three countries.

The immediate purpose of the preceding digression has been to underline the difference in interpretation of indices of the price movements of export goods or of import goods, compiled from the price movements of a number of selected articles, the price movements of which may be less representative than corresponds to their comparative importance in the total trade of the country, and of indices formed from records of the entire mass of exports or imports. The application of the former class of index to trade-cycle analysis may have been less effective than was intended in some cases. The importance, in the internal economy of a country, of price variations of goods imported or exported may well differ from their importance in reference to the correct interpretation of the records of foreign trade. The Danish report, to which reference has been made above, calls attention to the need for consideration of the quantities handled. A trap for the unwary may be revealed by such differences as those that were found in the case that provoked this comment, and even such eminent statisticians as those of the New York Federal Reserve Bank, in using indices compiled from data relating to selected commodities to represent the general price movements in British foreign trade, were entangled in such a trap, and decided in the end that the exhaustive calculations made by our Board of Trade did not need supplementing by such indices. To the extent to which the lack of more exhaustive compilations has led to the use of indices of the movements shown by samples, in obtaining measures of the changes in the volume of international trade in the world at large, the results would appear to leave something to be desired. Some caution is necessary, at least, in applying conclusions that may be reached by these methods.

Indices of Wholesale Prices.

It is, however, time to take up the consideration of recent Scandinavian work in the more general field of price indices. Since the war, and until quite recently, all three of the countries with which we are especially concerned on this occasion prepared monthly a weighted arithmetic average of the percentage change of wholesale prices of selected commodities from the average prices of the year 1913.

The grouping of the results is broadly similar in the three countries. Some individual items may be found in different groups in different cases, but the general lines of a classification that is used in other economic statistics, as well as in those relating to market prices, are the same in all three countries. The relative importance of the different groups is, however, in the nature of the case, not the same in all three. The combination in Denmark of the two groups of Timber and Paper found in Sweden and Norway is an illustration of such a difference, following on different natural conditions and consequent industrial development. The indices of wholesale price movement thus differ in fact, in spite of the large measure of parallelism in their construction.

The use of the year 1913 as a base year has, after a considerable run, ceased to be a common feature, as Denmark replaced it by the year 1931 as from the beginning of last year, full monthly details on both bases being calculated for the year 1935 and, in addition, monthly aggregate indices for 1934 on the new basis. Prior to 1935 the index used was roughly similar in construction to that prepared in the Labour Department of the Board of Trade prior to 1921, average import values being freely used as measures of price variation. In changing the base year from 1913 to 1931, opportunity was taken to adjust the relative weighting of the several groups, and to introduce market price quotations in substitution for a number of those earlier average import values. Thus there is no assurance that, if either the new index were able to be carried backward or the old one forward, the movements indicated would be identical.

The change in the Danish index had been preceded by a modification of the Norwegian index, which took place in 1931, the new details being prepared for each month from the beginning of 1928. The base year (1913) was not changed, but, in the determination of the weighting, information relating to 1927 and 1928 replaced that relating to 1916 or thereabouts, that had been used in the construction of the earlier index. The new information had the advantage of being more complete and more suited to the purpose in hand than that available at the earlier date. As will be seen from the summary below, the outstanding changes in the weighting were a reduction in that assigned to Textiles and Clothing, and an increase in that of the Vegetable Food group. The decreased importance assigned to the Timber group and the increase for the Pulp and Paper group nearly balance each other: that is to say, it is largely an internal change in the larger aggregate of "Timber and its products." That internal change gives increased emphasis to the lowering of the paper index and decreased importance to the manufactures of wood, which suffered, however, a smaller reduction in the substitution of new for old types of representative products. The Textile Products group suffered a reduction (at the period of change) of about one-third of its relative importance,

TABLE B.

The Weighting of the Norwegian Official Index of Wholesale Prices.

(1913 = 100.)

Groups.	Before 1928.		Products of Weights and Indices for 1928.		In and After 1928.		
	Average Index in 1928.	Percentage Weight	Old Weights and Price Data.	New Weights and Price Data.	Percentage Weight	Average Index in 1928.	Average Index in 1936.
1. Vegetable foods ...	173	14·2	2,457	2,990	17·8	168	125
2. Animal foods ...	149	29·6	4,411	4,145	28·2	147	126
3. Fodder stuffs and fertilizers	150	6·0	900	1,072	7·1	151	121
4. Fuel and oils ...	122	12·7	1,550	1,644	13·7	120	116
5. Metals and metal products	144	5·0	720	808	5·9	137	141
6. Bricks, cement, glass	191	1·5	286	269	1·4	192	175
7. Wood and wooden goods	194	4·7	912	611	3·2	191	182
8. Pulp, paper and board	169	2·1	355	592	3·7	160	131
9. Textiles and clothing	191	15·8	3,018	2,054	10·7	192	172
10. Hides, leather, footwear	171	6·3	1,077	1,044	6·0	174	141
11. Chemical products ...	188	2·1	395	425	2·3	185	148
All articles ...	161	100	16,181	15,654	100	157	134

while the Vegetable Foods had their importance increased by more than one-third, changes in the indices resulting from revision of the price data reducing the significance of the increased nominal weighting.

In Table B the weights are shown as percentages of the aggregate of all the weights.

The proceedings at the last conference between the heads of the Scandinavian Statistical Departments indicate that Sweden is fully conscious of the desirability of basing calculations relating to the averages of current movements of prices on the records of a period much more recent than 1913. The selection of a year suitable for the purpose is a matter of some difficulty. The transfer to 1931 by Denmark does not seem to reflect any agreement directed to future parallel action in the three countries. The economic shock of the breach between sterling and gold in 1931 may not be so serious a disqualification of that year as would appear at first sight. The selection of 1929 as a base year for the presentation of comparisons between economic statistics in different countries in the latest issue of the *Statistical Year Book of the League of Nations*, following similar action by the International Labour Office, suggests a possible choice of a year other than 1931. In itself, 1929, marked as it was by the beginnings of the plunge into depression, appears not to present ideal conditions for serving as a general basis of comparisons, even as a rival to 1931. Possibly a more recent year than either may be found to possess a balance of advantage. There is something to be said for 1935, if a general agreement to abandon the use of 1913 in current comparisons is not to be relegated to an inconveniently distant future.

The Consumption-prices Index of the Swedish Riksbank.

While there is no need to consider particularly this evening the Swedish official (Board of Trade) wholesale prices index, there is another price index which has been introduced into the apparatus available for guiding economic judgments in Sweden, to which attention may well be directed. It has been designed for use by the Riksbank, as a means of presenting up-to-date indications of the tendency of prices, an element of obvious interest in the consideration of policy by that institution. If the maintenance of an average price level, the fluctuations of which shall take place within a limited range only, is an object to which that policy is to be directed, as would appear to be the case, not merely has the new compilation a scientific interest, but it may have much practical importance. The preparation of the new series has been carried out by Professor Erik Lindahl of Gothenburg, who has described its construction in the *Ekonomisk*

Tidskrift for 1933 (pp. 83–126). The work of compilation is carried out by the staff of the Riksbank, in consultation with the Board of Trade and the Department of Social Welfare. Both published and unpublished price information, the latter supplied by arrangement with the Bank, is used. The measurement of the price changes of consumption-goods is aimed at, the movements measured being, therefore, those of retail prices, or of charges for direct services rendered. About 160 separate price series contribute to the final index, and these have been selected with a view to covering the whole range of consumption within Sweden. Many of the prices used, in the nature of the case, coincide with those from which the official Cost of Living Index is compiled, but the new index covers also goods and services other than those on which the earnings of the so-called working classes are spent, and other grades or qualities where the goods are, in their nature, similar. Some items, such as insurance premiums and trade-union subscriptions, are not taken into the new index, and in place of outlay on taxes there is taken the cost of public services, represented by outlay of the central or local Government on goods and services for the general benefit, and on the maintenance of public institutions with the same end in view.

The Department of Social Welfare (Socialstyrelsen) is charged with the collection of the price data, having regard to the fact that, being responsible for the Cost of Living Indices, convenience and economy point towards such an arrangement.

The averages for the entire country are prepared as arithmetical averages of prices from fifteen towns or district centres, including Stockholm, which is assigned a treble weight, and Gothenburg, which gets a double weight, in comparison with the remainder of equally weighted localities—for the smaller towns are taken as representative of the population of which each is, in a sense, the commercial focus. The actual population of Stockholm a year ago was 8·5 per cent., and that of Gothenburg 4·1 per cent., of the total population of Sweden. The remaining centres for price records had, together, a population about half-way between that of the two largest towns, named above. The representative character of the evidences of price changes obtained by arranging the information from fifteen centres cannot, of course, be judged from the total living in the selected agglomerations.

The several price series are combined—that is, their percentage variations from one date to another are combined—by calculating a weighted arithmetic average of the several percentages of change, the weights being calculated in accordance with the distribution of total expenditures on the several classes of goods or services the charge for which is taken to be represented by the elements of the several series. The basis of the distribution of weights was found in the results of an enquiry into the amount of the national consumption in 1927, and its distribution according to its constituent elements. This enquiry by the Social Economics Institute of the Commercial High School of Stockholm was taken as a base for an estimate of like character for the year 1931, the details of which served for the determination of the weighting of the new index. In the nature of the case, as will be clear from what follows, the initial weighting will need to be adjusted, to provide for variations in the make-up of the national income of goods and services, both as it grows with business activity and growth of population and as it declines, from time to time, with trade depression or, at some future date, with decreasing population. Further, seasonal variations in the make-up of the national consumption should, in principle, be accompanied by corresponding changes in the weighting of the different elements in the price index. It has been suggested that the elimination of purely seasonal fluctuations would be suitably dealt with by variations in the weighting of the price series that relate to consumption affected by seasonal change, in part at least. This is, it would appear, recognized in the plan of operation laid down in Professor Lindahl's memorandum.

The reaction of consumption (and still more of purchases) to the raising or lowering of the price at which supplies can be acquired, is recognized as a phenomenon calling for, or at least justifying, corresponding variations in the weights applied to series displaying such changes. In practice, partial and approximate adjustments alone are possible. In some instances of marked seasonal fluctuations the weights may be adjusted in accordance with experience of which records may be obtainable. The fluctuations that remain after such adjustment are those the study of which may have special significance.

The index itself is a chain index built up from links calculated weekly. The procedure is familiar enough in this country, being illustrated in the index of retail turnover calculated in recent years in the Economics and Statistics department of the Bank of England, or, for that matter, in the Board of Trade index of wholesale price movements, in which the month to month movements, and the movements between a particular month of one year and the corresponding month of the preceding year are both calculated, and serve as checks on each other. The variation of weights from month to month is a development that is, in effect, applied to any geometrical-average index that is corrected for seasonal changes.

If the weights are varied from week to week, in principle if not in every instance in the practical working, a question of the appropriate weighting presents itself in the form: "In calculating the movement from any week to its successor, should the consumption of the earlier or of the later week determine the weight to be applied?" The answer adopted by Professor Lindahl is "The arithmetic mean of the consumption of the two weeks compared."

The importance of the adoption of the procedure described above is the facility it affords for prompt substitution of one commodity—or quality—for another when changes occur in the practical response to market conditions. In this Society I shall not need to enlarge on this topic.

It will be sufficient to mention that, in the published material, separate monthly figures of the chain indices are given for dairy products (86), for meat (64) (pigmeat separately (34)), for fish and eggs together (20), for bread, flour and meal, potatoes, dried legumes (67), for garden produce (19), for sugar, dried fruit, spices etc. (51), and for drink and tobacco (79), with a general index for these eight groups; for furniture and household equipment (83) and for other durable equipment (45) together with the two in combination: for fuel and light (40); for clothing (107) and for footwear (45) and for both together; for rent (105), and for a group of "other outlay" subdivided into laundry and health (28); books, amusements, travel (120) and "public services" (41). The figures in brackets show the weights assigned.

The indices for all consumption together began to be computed from September, 1931, and this month is taken as the base period in compiling the chain index, including its extension to complete the 1931 record.

TABLE C.

The Riksbank consumption-price index.

(Sept. 1931 = 100.)

Month. Year	1931.	1932.	1933.	1934.	1935.	1936.
Jan.	102·4	99·8	99·6	98·5	99·7	100·7
Feb.	102·2	100·4	99·7	98·5	99·7	100·8
March	101·7	100·7	99·0	98·5	99·7	101·0
April	101·5	100·4	98·5	99·0	99·6	100·8
May	101·1	100·6	98·5	98·9	99·9	100·8
June	100·9	100·7	98·2	99·0	100·3	100·8
July	100·4	101·0	98·7	98·9	100·7	100·8
Aug.	99·9	100·5	99·0	99·1	100·5	100·5
Sept.	100·0	100·8	98·7	99·2	100·3	100·3
Oct.	99·7	100·6	98·5	99·3	100·6	101·1
Nov.	99·7	100·6	98·4	99·5	100·7	101·1
Dec.	99·8	100·3	98·2	99·5	100·7	101·0

Note.—The index for Dec. 1930 is 102·6.

In Table C the figures for 1931 and 1932 are taken from the article in the *Ekonomisk Tidskrift* previously referred to. For 1933 to 1936 the figures are taken from *Sociala Meddelanden*, and represent, it would appear, the figure for the week in each month in which the middle day of the month falls. The correction for seasonal fluctuation has been made in these figures, but not that for new or increased indirect taxation.

The range of variation of the consumption-price index during the five years following its initial compilation has been very limited. The highest point, 1·1 per cent. above the starting point, was reached in October and November last. In the other direction the extreme point is 98·2, recorded for June, 1933, and also for December of the same year.*

Apart from the availability of the index week by week, and the more detailed investigation of the situation arising out of the procedure of its calculation, an interesting question seems to remain without more effective answer than when it was put four or five years ago—namely, that of the extent of the gain from substituting the new weekly figures for the quarterly Cost of Living index as a measure of the fluctuations in retail expenditures caused by price variations. That a more reliable measure of movement from any one date to any other not far distant is afforded by the index formed of a chain of short links than by the index constructed by direct comparison of current data with the presumably equivalent data of a period so far away as to render the equivalence and the deduced indices a little open to doubt at the best, may be conceded. But that the small errors concealed in the figures, expressing a series of movements that are small because the time within which change could occur was short, may cumulatively become of some importance, in spite of controls and checks, seems difficult to deny.

Meanwhile, the experiment of the new index leaves a wonder in the mind of the observer as to whether it has been able to contribute to the certainly remarkable stability to which both it and the official Cost of Living index bear witness. Sweden is not alone in having recorded a strikingly small range of variation in its indices that measure changes in the expenditure needed to maintain a given standard of feeding, clothing, lodging and other elements of civilized living.

Statistics of Industry.

When we come to the question of industry and its development in the Scandinavian countries, we approach a tangled problem indeed. Let us look, for instance, at Table D, in which there are presented some figures that may serve as a starting point.

I have shown the numbers gainfully occupied on the land or in fishing, partly because that is a figure on which there is more approach to agreement than in the case of other main branches, and partly to emphasize the large relative importance of other means of earning a livelihood in countries commonly regarded as agricultural in the first place. The question of the numerical importance of the bread-winning labours of wives and of members of the families of the numerous small landholders, who contribute to the working of the holding without an agreed money payment for their work, need not, I think, be raised. It will be seen that, in each case, the proportion of the population that was between 15 and 65 years old, which may serve as a measure of the possible productive human resources, increased between 1920 and 1930, and also the proportion of those at these active ages that were recorded as gainfully occupied (the unemployed being classified under the industry to which they considered themselves to belong). Of the total so recorded, the proportion not engaged in agriculture, forestry or fishing increased both in Sweden and in Norway, but was the same within a small fraction in 1930 as in 1920 in Denmark. In 1920 the percentages were clearly different, in 1930 they were all quite close to the figure 65.

---

* In January, 1937, the previous highest figures have been exceeded.

Table D.

	Population.		Gainfully Occupied. ('00.)	Of which in Agriculture, Forestry and Fishing. ('00.)
	All Ages. ('00.)	Ages 15-64. ('00.)		
	1930.			
Sweden	6,141·6	3,950·8	2,922·0	1,040·8
Denmark	3,550·6	2,311·0	1,603·2	559·7
Norway	2,814·2	1,777·5	1,167·5	412·3
Total	12,536·4	8,039·3	5,692·7	2,012·8
	1920.			
Sweden	5,904·8	3,679·1	2,620·6	1,058·4
Denmark	3,267·8	2,019·3	1,361·8	474·6
Norway	2,649·8	1,596·3	1,070·4	393·8
Total	11,822·4	7,294·7	5,052·8	1,926·8

This does not imply that the proportion engaged in manufacturing industry is closely similar in the three countries, whether that term is used so as to include the building industry, or the supply of water, gas and electricity, or mining and quarrying, or not. Commerce, communications, the professions, government administration and personal service, as well as any of the three distinct activities named, have to be provided for. There is, unfortunately, as yet no uniform practice in the allocation of different activities to the several groups, and the interesting question of the relative degree of industrialization in one country and another cannot find much illumination from the summary figures that are commonly found in Government reports. From the sources described below, sufficient indications are obtainable regarding the group of trades to which, in the reports on the British Census of Production of 1930, and on subsequent inquiries, the name "factory trades" has been applied, to warrant an estimate in excess of 1,000,000 for those employed in that group of trades in the three Scandinavian countries in 1935. As unemployment has been severe in these trades, the total of those who must be assigned to this group, in any attempt to measure its importance in comparison with the total of occupied in the several countries, will be substantially more than a million. Perhaps something in the neighbourhood of one-third of those not occupied in agriculture, forestry and fishing may represent the share of manufacturing, in the sense above defined, in the activities of these nations. Further, the number appears to be increasing, though the measure of the increase is not readily determined. It is certain, at least, that the importance of industrial production is leading to the development of statistical measures of its growth, and to this development I propose now to turn.

The Newer Industrial Statistics in Norway.

I begin with Norway, in spite of its smaller industry—smaller both absolutely and relative to its total activities—because, of the three countries, Norway alone gives really special attention to that element in the data of industrial production which evades the tendency to repeated record of the same thing at different stages, and which we call "Net Output."

In 1909 and in 1916 the Norwegian Central Bureau of Statistics had begun the taking of Censuses of Industrial Production in the sense of that term familiar to us. In April, 1928, schedules were distributed for the purpose of securing the first of an annual series of records, not merely of things produced, persons employed and power used, but of other elements needed to complete the account of production. The establishments with less than 5 persons employed (a number varied somewhat for particular trades) were not included in the accounts to be prepared. In actual fact, the limit of exclusion, like the record of work put into the processes of transformation, was not measured by the number of hands employed, but by the number of man-hours of work performed, this item of information having been brought into general use in the preceding summaries of particulars that had been prepared by the department concerned with workpeople's insurance in respect of industrial accidents. The exclusion of the small establishments meant, in the first year, the exclusion of the results of 22·2 per cent. of the total man-hours worked,* in connection with which 21·2 per cent. of the aggregate of all wage-payments in industry were made. This, it is important to notice, means that the objection to a return of the aggregate wages-bill, which in this country has stood in the way of learning a number of important things about industry, is not felt in Norway, or not allowed to prevail in keeping the Government dependent on estimates for so important a feature of industrial organization. Other things demanded included the cost of purchased materials in some detail, with quantity and value of each specified item, the aggregate of salaries paid to the administrative staff, details of cost of fuel and electric power used, cost of tools purchased and particulars of capital employed, including the fire-insurance valuation of buildings and of plant and stocks. On the basis of such information annual reports have been prepared since that for 1927, the latest, dealing with 1935, having been published since the end of January. The trades separately dealt with in that report numbered 75, grouped into 13 sections.

Among the detail of the results there are a few points to which I am tempted to direct attention, in spite of the multitude of matters of general interest which challenge prior consideration. The first is that the average Net Output per head of the persons employed in the Factory Trades in Great Britain in 1930 was £221, while in the corresponding trades in Norway the average was £328. This average omits 6 of the 75 trades covered by the annual industrial summaries. Thus costs appear to be higher in Norway than in Great Britain. We are in a position to test one feature in these costs with the help of the approximate figures of the wages-bills furnished in the final volume of the report on the 1930 Census here. The wages-bill there shown for the Factory Trades was £490,000,000 or about £118 per head of the operative staff employed in 1930. The average wage paid to operatives in the Norwegian trades included in the above comparison was £150,† the average working hours in the year being 2,253 or, of we assume 50 weeks worked in the year, 45 hours per week on the average. In Great Britain in

---

* The exclusion was 15 8 per cent. in 1930 and 18·0 per cent. in 1934.

† About one in five of the Norwegian operatives were female, while, in the British figures we are using, the females formed 37 per cent. of the total. The average of the net outputs per head in the Norwegian trade-groups, weighted by the numbers employed in Great Britain in corresponding groups is about £300. A similar weighting of the net outputs per head in the British groups by the corresponding numbers employed in Norway gives an average of about £250.

1930, wages to operative staffs in these groups of trades needed 47 per cent. of the net output to meet them, in Norway the corresponding percentage was 40½.

We pass now to the Index of Production that, based on the annual returns and on other material, has been maintained as a monthly calculation from the beginning of 1933.

The establishment of a Census of industrial production at annual intervals was not immediately followed by the preparation of a series of indices of the variations in the total volume of production, but when that step was taken in 1931, the year 1927 was used as the starting point of the series, and the figures of net output in the different trades separately dealt with, as shown in the report for that year, provided the weights for a geometrical average of the indices of change in volume of output. Annual data of output were available for a number of trades. In the important metal trades the variety of the items making up the total made a direct aggregation of output impracticable, and the records of man-hours worked were made use of. In carrying the index back to 1909, import and export returns, in combination with the man-hours worked, were employed where production returns for the earlier years were not available.

The clothing industry (*i.e.* clothing other than boots and shoes) has been included in these comparisons only from 1927. Earlier, the growth in the proportion of the industry represented by the available returns would have given a fictitious picture of its relative growth, and it was deemed best to omit it. Building is not included, and the numerous small enterprises above referred to are by no means fully represented.

In adding monthly figures to the annual comparisons of industrial activity, the comprehensiveness of the basis of the calculations was necessarily reduced. The representative character of the information available was not fully up to the level of that annually obtained. A larger use of the man-hour data was deemed justifiable in the preparation of a measure of variation within the limits of each year. The annual index is not an average of the monthly figures, nor is the monthly series adjusted at the end of the year so as to bring their average to the same figure as is calculated, from fuller information, for the annual index.

The monthly indices relating to the individual branches of manufacture are combined into a weighted arithmetic mean, the relative weights being the net outputs of the several branches shown in the statistics of industry for the year 1932. It was in the autumn of 1933 that these indices began to be prepared, and the 1932 data, then newly available, were preferred to those for 1927. In fixing the starting point, too, the immediate situation was clearly responsible for the choice of the first half of 1933 as the period from which, as basis, later figures were to be expressed as percentages. The intention expressed when the early figures were published, to adjust the figures when the first year was completed, so as to make the whole year 1933 the basis of calculation, was not carried out. In future, the monthly index is to be calculated in the same manner as the annual index. The figures for the first four years are given in Table E. It should be added that the figures are prepared so as to show the variation in the volume of production per working day in the months to which they relate.

TABLE E.

Norwegian Monthly Index of Production.

(January–June 1933 = 100.)

		Partial Indices.				Complete Indices.			
		1933.	1934.	1935.	1936.	1933.	1934.	1935.	1936
Jan.	A	100·2	94·9	116·1	127·3	93·3	94·9	103·8	115·4
	B	90·2	95·2	97·8	109·9				
Feb.	A	112·6	108·8	128·7	139·0	102·2	105·9	114·7	123·1
	B	97·1	104·1	108·0	115·0				
March	A	96·5	108·1	107·5	114·0	96·1	107·1	107·0	117·6
	B	96·4	106·7	106·9	119·9				
April	A	91·0	90·7	101·4	103·2	99·5	100·5	109·2	114·5
	B	103·6	105·6	113·3	120·9				
May	A	93·0	96·2	109·0	117·3	101·2	105·1	111·4	121·8
	B	104·3	110·3	112·7	124·1				
June	A	106·7	108·9	107·4	121·8	107·7	111·3	117·1	124·3
	B	108·4	113·1	122·9	125·5				
July	A	69·6	98·0	83·4	106·7	80·9	98·0	90·8	106·9
	B	88·1	97·8	96·1	107·6				
Aug.	A	75·9	95·8	95·4	104·5	90·5	105·9	105·9	122·3
	B	99·5	110·9	111·6	132·8				
Sept.	A	92·2	102·0	103·1	117·4	99·7	111·9	116·8	129·4
	B	104·2	116·6	124·3	136·4				
Oct.	A	106·8	107·3	111·8	118·1	105·0	109·0	117·1	127·9
	B	104·0	109·1	120·4	133·5				
Nov.	A	111·7	110·3	126·1	120·9	108·2	110·6	121·7	131·2
	B	105·9	110·6	119·4	137·1				
Dec.	A	107·8	115·2	112·1	119·7	104·9	109·0	115·7	126·5
	B	103·8	105·3	117·5	130·4				
Year	A	97·0	103·0	108·5	117·5	99·1	105·8	110·9	121·7
	B	100·5	107·1	112·6	124·4				

Note.—A gives figures for production for Export, B figures for home-market goods. Group Indices for trades producing consumption-goods and for trades whose output consists of equipment for production are also published.

The annual indices, calculated on 1930 as a new base year in place of 1927, were, for the three years 1933–35, 92·9, 96·8 and 106·6. It will be seen that the progression of these numbers is notably different from that of the annual averages of the monthly indices for the same years.

For the year 1935, a Census of Business Establishments is in progress embracing, not only mining and quarrying and the manufacturing industries covered by the annual enquiries, but also the public utility services; building and contracting; commerce, banking, insurance, and agencies and auxiliaries to these; hotels, restaurants, and eating-houses conducted for purposes of gain; transport and communication, including transport by sea, and seal- and whale-fishing. Entertainment agencies, like the agencies mentioned above, to which they are assimilated, are included, but not the artistic side of entertainment, or the liberal professions or public administration.

Except for industrial workers who have no assistance, whether from members of their families, or from hired persons, the enquiry is to cover even the smallest enterprises.

The value of goods produced for sale, of goods merchanted without having work done on them, and of work done on the materials of other firms or repair work for others, the totals of salaries and of wages paid, and information as to power plant and, in the case of companies, the face value of their capital, are required, as well as particulars of age, sex and occupation of each member of the staff.

Industrial Statistics in Sweden.

Passing to the Swedish records, annual data of numbers employed, distinguishing operative staff and various classes of administrative staff, of the sale-value of products of the year and of the mechanical power, and also of fuel, used are obtained from manufacturing establishments, including mines and quarries, slaughtering establishments, dairies, and water, gas and electricity works. The man-hours worked (men-days before 1920), as well as the number of operatives on the pay-roll, are shown, with a distinction of male and female, and of persons 18 years of age and over from the younger operatives. In this group of figures a distinction is also made between those engaged in manufacturing operations, and other wage-earners, such as those engaged in packing, in transport, in running the power plant, etc., the average hours worked by the latter being in excess of those worked by the former. Over the years 1931–4, for example, the average weekly hours, taking 50 weeks as a working year, were 41 for all wage-earners (as distinguished from administrative workers) the manufacturing operatives working a little less, while the auxiliary staff averaged 43 hours per week. In the different industrial groups the averages vary, and in particular cases the contrast of average hours worked by manufacturing and auxiliary staff almost vanishes.

So far as the work is spread over a larger number than are actually employed at a given point of time, the personal average time worked will, of course, differ from the figures resulting from the comparison of the average present in working hours and the aggregate of man-hours recorded.

The particulars of goods produced, both as to quantities and values, do not fall short of those presented in our Census of Production Reports. The classification of firms according to the numbers employed, though not stated year by year, has been furnished for 1920, 1925 and 1930—and for 1913, and the absence from the annual reports of figures permitting net outputs to be determined is met, at least in part, by special studies of individual industries in respect of the kind and quantity of the materials used, the results of which are published in the monthly journal of the Department, the *Kommersiella Meddelanden*, as they may be available.

The annual figures collected and published relate, broadly speaking, to manufacturing operations of establishments employing more than 10 persons, other than the proprietor or proprietors when these are actively engaged in those operations. Three of each five of the establishments covered by the yearly reports appear, from these special surveys, to have employed 10 persons or less, a feature that is explained by the fact that a limit of value of output is applied in addition to the limit of numbers employed. Particulars are given in the report for 1926, when the limits were reduced from those still surviving, in part, from the inflation of the war and post-war period. A gross output limit of 15,000 kronor (worth about £825 at that time, and about £770 now), or a receipt for work done on materials of other firms of 4,000 kronor (now about £260) for the establishment was then fixed, with higher limits for such cases as goldsmiths' and jewellers' workshops. Fewer than 1,700 persons employed were added, as an outcome of this change, to the figure of about 400,000 then reached for operative staff employed.

The Census of Establishments of 1930 provides, in much greater detail than the annual figures, the results of a complete survey of business, not only manufacturing but trading, transport, finance (banking and insurance) and entertainment. The nature of the particulars obtained is similar to that of the more limited annual survey, but the analysis is more complete and detailed. It may be added that market-gardening and forestry were covered, though agriculture was not included in this enquiry. The number of establishments reporting was 237,561, of which three-quarters were in personal private ownership. The numbers employed, including owners, were 1,371,290, and of this total there were 483,988 in the private firms, which were responsible for 30 per cent. of the total turnover of £975,000,000 (at the then effective gold parity) reported for all establishments, about £250,000,000 being reported by wholesale and £170,000,000 by retail trading establishments, the latter figure including combinations of wholesale and retail trade, but not combinations of trade and industrial production.

Based on the annual particulars of production in manufacture and mining, an index of the variations in the volume of production, not only in the aggregate, but in each of nine groups customarily used in the presentation of the statistics, has been prepared annually by valuing the output at 1913 rates, subject, of course, to the familiar difficulties owing to variations in quality or grade of output, similarly described, from the average qualities or grades produced in 1913. With these computed values, indices both of volume of output and of average prices are calculable, for each industrial group and for all groups together. The groups are: (i) Metallurgy (incl. Ore Mines) and Metal Goods, (ii) Coal mines, quarries and products of stone and clay; (iii) Sawmills, and timber products other than pulp; (iv) Paper and printing; (v) Food, Drink and Tobacco; (vi) Textiles and textile clothing; (vii) Leather and leather goods (boots and shoes included), rubber goods; (viii) Chemical industries; (ix) Gas, water and electricity supply. For the purposes of the first three columns of Table F, below, those branches of industry not included in the "Factory Trades" division of the British Census of Production reports have, as nearly as was practicable from the published data, been excluded. The changes in Swedish manufacturing activity are not concealed by this exclusion, and the results may be more comparable with things familiar in this country. Thus the whole of group (ix), the slaughtering establishments and dairies in group (v), although some meat-preserving is unavoidably excluded at the same time, the Coal Mines and the quarries in group (ii) and the ore mining and handling in group (i) are put aside, and the remainder treated as characteristically industrial activity.

In addition to the very comprehensive index of the changes in the physical volume of Swedish industrial output, another index has been prepared for, and was first published in 1932 by, the Federation of Swedish Industry (Industriförbundet). This is a monthly index and appears to have been prepared mainly from data furnished to the Federation, supplemented by information available from published sources. The main element in determining the weighting of the different industries, for which partial indices of activity are prepared, is the average number of the operatives in manufacturing processes in 1930 that was employed in the industry to which the partial index relates. The monthly fluctuations recorded for the years 1925–30 have been averaged, and the deviations from that average, treated as the normal seasonal variation, are registered in the aggregate index as published. The yearly averages for the ten years 1925–34 for which they have been published, and the indices relating to the output of Consumption Goods and of Production Goods respectively, are represented in Table F, showing the results of the official calculations. All are presented in series adjusted so as to give an average of 100 for 1929, as in similar results shewn earlier in this paper, the proportionate variations from year to year during the decennium being those shown by the figures as published.

A new index has, more recently, replaced that just described. This new compilation is based on figures of production per man-day, the figures relating to 1935 as a whole being taken as the basis of calculation. Thus the percentages of current figures to the 1935 average provide the elements of the calculation. As shown in Table G, the year 1936 showed an advance on 1935 averaging 8 per cent.

TABLE F.

Swedish Industrial Activity 1924–34.

Year.	Thousands.		Average Hours Worked.	Index of Product.		Federation of Swedish Industry Index.			
	Administrative Staff.	Operatives.		Volume. (1913 = 66·2.)	Prices. (1913 = 65·1.)	All Industry. (1925–30 = 90·9.)	Prodn. Goods. (1925–30 = 87·0.)	Consn. Goods. (1925–30 = 96·2.)	New Index. (1935 = 125.)
1924 ...	34·7	347·4	2,126	72·1	111·1	—	—	—	—
1925 ...	36·0	356·0	2,090	74·2	110·5	81·8	77·4	88·5	—
1926 ...	38·8	370·9	2,116	81·5	105·9	84·5	78·3	93·3	—
1927 ...	39·9	373·2	2,154	84·1	104·0	87·3	80·9	96·2	—
1928 ...	42·9	399·4	2,095	88·7	103·3	94·5	91·3	98·1	88·7
1929 ...	45·0	412·4	2,141	100	100	100	100	100	100
1930 ...	46·7	413·1	2,115	99·3	95·4	96·4	93·9	100·0	98·7
1931 ...	47·8	394·4	2,035	95·4	86·9	84·5	78·3	95·2	95·0
1932 ...	47·5	369·2	1,990	90·1	83·7	88·2	68·7	96·2	90·0
1933 ...	48·2	363·3	2,041	96·0	81·7	81·8	73·0	95·2	95·0
1934 ...	51·9	408·4	2,132	115·9	83·0	100·0	91·3	112·6	113·7
May, '35						109·1	100·0	122·1	125

But for an extensive labour dispute in 1934, the original purpose appears to have been to make that year at once the concluding period for the older calculation and the starting point for the new. The data of both the new and old indices were prepared for each month of 1934. The members of the Federation have manifested, it appears, considerable interest in the former index and their leaders have been able to secure from them an extended supply of data for use in the preparation of the new series. The constituent Associations of the Federation are also manifesting increased activity.

The inconvenience resulting from the variable periods for which monthly information is supplied is met, in the prescription for the new mixture, by making use of the average production per working day. Where these particulars are not available a running three-month average will provide a near approximation, but where men-hours are available that resort is not necessary. The irregularities of returns covering sometimes four weeks and sometimes five, and representing periods with continuous working at one time and periods interrupted by holidays or by disputes, or stoppages for other reasons, at another, cannot be deemed satisfactory.

The information supplied is not combined into trade aggregates at the outset, but an index series is compiled (as was also the case in the former index) for each establishment represented, or at least for the establishments turning out the same product. The seasonal variations are dealt with at this stage, not after the aggregation of the details into a final index, or even into group indices. The divergencies between seasonal variations in different trades or branches of trades may, or may not, compensate each other and, if seasonal effects were repeated year by year, considerable reliance might be placed on this principle, but the attempt to deal with them where they arise is at least interesting, and may be of determining importance. In any case, the material for establishing a formula for adjusting the monthly figures for seasonal variations has not yet been accumulated in reference to this particular index, and only the well-marked movements of this character can be dealt with confidently pending further experience with the material at disposal. In the case of a sub-group dealing with the export timber trade, a running twelve-month average is employed, and this index is, consequently, always half a year behind, since the averages are assigned to the month following the mid-point of the series of twelve.

The precise omissions and inclusions need not be dealt with at length here, as they appear to depend largely on the availability of data rather than the theoretic limits of the significance of the index. If that be the case, time may alter the comprehensiveness of the calculations. The " weights " assigned to the different items, or groups of items, are, in principle, the " net outputs " of the trades producing them. A deviation from this standard is found in cases in which the raw material in a trade is derived from another home industry not fully represented in the collection of data. The omission of such material from the deductions from gross outputs in order to determine net outputs may, it is claimed, be justified on such grounds. The question of justification in degree as well as in principle may call for some detailed consideration. The availability, at the time of planning this index, of part only of the material needed for determining the net outputs with sufficient accuracy in all cases seems likely to have no small importance, particularly pending the completion of the surveys relating to 1930. Meanwhile a scheme of weighting was devised which, not improbably, may be adjusted should the full issue of relative material indicate the necessity for change. In the formation of composite indices for groups or sub-groups, in respect of which net outputs may not be separately calculable, the proportions of the men-hours worked in the several establishments whose data make up the representative material for the group index are proposed as useful weights for these data.

In place of the former grouping of the index data so as to form indices for " investment goods industry " and " consumption goods industry," for " home market industry " and " world market industry," a grouping has been adopted according to the character of the goods manufactured, with an eye to their relation to the problems of the trade cycle. The reproduction of the results here is, perhaps, not fully justified, but, as the other index figures, given in Table F (see p. 254) stop at a time of great interest, the following brief summary may be permitted, as it indicates that the sharp upward movement of 1934 may not even yet have approached its climax.

TABLE G.

New Swedish Index of Production.

Year.	Jan.-March.	April-June.	July-Sept.	Oct.-Dec.	Year.
1934	85	91	93	97	91
1935	97	100	100	103	100
1936	104	106	109	113	108

Industrial Statistics in Denmark.

In the matter of assembling data of industrial production and preparing indices of industrial activity, Denmark has proceeded on lines broadly similar to those which I have described in the case of its two neighbours. There are the Censuses of Business Establishments, the annual assembly of data of output from the larger industrial establishments, and the calculation of monthly indices. The two latest of the general surveys, covering 1925 and 1935, dealt with establishments, in the " Factory Trades " of the British Census of Production reports, employing respectively 289,000 and 341,000 persons, of whom 204,000 and 231,000 were engaged as operatives in the factory processes and the remainder were auxiliary workers and administrative staff. As the numbers of establishments were, respectively, 59,000 and 66,000, the average personnel per establishment was in the neighbourhood of 5. The annual returns of industrial production exclude, except in the case of the trades manufacturing excisable articles, the establishments with five operatives or less, and the total number of operatives to whose work the annual statistics related in 1935 was about 150,000 out of the 341,000 persons working in all establishments in the trades concerned. The numbers of other staff in the several branches of industry are not shown in the annually published reports.

These reports furnish particulars of the numbers of male and female operatives, and how many of each were under 18, for each of the 70 trades covered by the above figures, except four, all of which are conducted under excise control, though these four are not all the trades so conducted. The age, and in two of the four cases also the sex, distribution is omitted in these instances, but it is not stated whether all were of the male sex in the latter instances, or if all were adults in these exceptionally recorded trades. The report also lacks a summary of the particulars in question, which might emphasize the lack of uniformity in the data provided by state-controlled enterprises. It should be added that, in a number of instances, the staff is divided among two or more subdivisions of the trade, or group of trades, concerned for which numbers are furnished, and that the numbers of outworkers (not included above) are separately shown, where necessary, their total being about 6,000. The particulars furnished include the values and, in most instances, the quantities of the leading classes of products making up the principal output of each of the 70 industrial groups separately shewn, to which are added particulars, in corresponding detail, of the quantities of the principal kinds of materials, and of the fuel used, together with the outlay on packing materials and on electric energy. Danish and imported materials were separately recorded.

The index prepared, in 1934, to replace the former calculations of the changes in volume of output as compared with that of 1913, was arranged with 1931 as base year, in accordance with the decision which also affected the selection of a base year for the revised Wholesale Prices index. The separate elements of the index are calculated to express the output per working day as a percentage of that in the preceding year, and these elements are combined by forming an arithmetic average the weights of which are proportionate to the net outputs in 1933 of the several trades. For the monthly index the data available are not as comprehensive as for the annual index, but the procedure is similar in character. The monthly figures may need adjustment when the annual index is compiled from the more comprehensive annual data, and the fact that they are, in this sense, provisional does not distinguish them from many other monthly calculations with broadly similar aims.

In addition to the index of production briefly described above, a monthly index of activity is calculated and published for the same groups of enterprises as are covered by the index of production. The calculation is simple, the returns of men-hours worked being aggregated for the establishments making returns, and the average of hours worked per working day is deduced. The ratio of that average to the corresponding average for the year 1931 is the required index. For separate months of any year, the monthly average for the year 1931 is used as dividend, and the quotient forms the index of activity for the group and month in question. The representative character of the firms contributing monthly figures will be the principal element of importance affecting the representative character of the index itself, as is, of course, the case for the index of production, for whatever country there may be calculated an index aiming at the measurement of the fluctuations during a year, or from year to year if the annual returns are not exhaustive. A summary of the indices of production and of manufacturing activity for the period since 1931 is given in Table H. So far as concerns seasonal fluctuations, the use of the monthly average of 1931 as a base figure for monthly indices, will effectively remove seasonal fluctuations, so far as they are regular year by year.

TABLE H.

Yearly and Quarterly Variations.

(1931 = 100.)

	Index of Industrial Activity.				Index of Industrial Production.			
	Jan.–March.	April–June.	July–Sept.	Oct.–Dec.	Jan.–March.	April–June.	July–Sept.	Oct.–Dec.
1934 ...	99	112	116	114	102	112	115	115
1935 ...	109	119	124	124	118	120	123	123
1936 ...	93*	129	134	134	105*	121	134	132

Whole Year.	1931.	1932.	1933.	1934.	1935.	1936.
Industrial activity	100	92	102	114	123	122
Industrial production ...	100	91	105	117	125	125

* An important industrial dispute in March is reflected in these figures.

Age Distribution of Populations.

The fact that Sweden, with its data of the distribution of and changes in the numbers of the population continuous from the middle of the eighteenth century, is the classical land of demographic statistics is both a reason why the citation of figures of this class might be deemed a work of supererogation, and, at the same time, a temptation to anyone writing on Scandinavian statistics. After so long a paper, there is every reason why I should limit myself narrowly, and this I propose to do. Professor Greenwood, in his address last June, laid down a standard in these matters that makes it fortunate for me that lack of space offers an excuse for a mere superficial handling of the great and attractive subject that will be thus lightly dealt with. Dr. Snow, however, in his paper of two years ago, when citing statistics of Scandinavian birth-rates, stopped, for some reason that I have not fathomed, with the figures of the nineteenth century. The changes of the present century have been so striking that I propose to refer to some of their results. Dr. Snow showed that, except in the case of Sweden, the birth-rates had, in the final decade of the nineteenth century, fallen little below the average of the 'sixties. Since that date the fall has been so sharp as to cause the most serious concern, and, at this moment, all three countries have Commissions studying the problem.*

In Sweden a special census of the population has been carried out for 1935, and, pending the publication of its results, any elaborate discussion of the extremely interesting conclusions reached by private enquiries, pointing to a slackening of the decline in fertility, in the capital city, of the more comfortable and cultured part of the population, would not be justified. Even in their absence, the later development of the Norwegian demographic statistics is a tempting topic, but would probably gain much in interest if taken up when the new Swedish data are ready. The course of the birth-rates since the turn of the century, has been as follows:

TABLE K.

Average Annual Live-Births per Thousand of Population.

	1901–10.	1911–20.	1921–30.	1931–35.
Sweden	25·8 (8·5)	22·1 (6·9)	17·5 (5·9)	14·1 (5·0)
Denmark	28·6 (11·1)	24·9 (9·2)	20·8 (8·0)	17·8 (7·1)
Norway	27·5 (7·5)	24·8 (6·4)	20·1 (5·1)	15·2 (4·5)

[The figures in parentheses show the percentage to births of the deaths under 1 year of age.]

Dr. Snow was considering, among other things, the reaction of the reduction in births on the numbers of the population in the active years of life. The proportions of the population that had passed their 15th birthday but had not yet reached the 65th compares, in Sweden and in England and Wales, as follows:—

---

* A report of the Swedish Commission, dated 4th Dec. 1936, was referred to in the *Times* of 13th February, 1937. This report is concerned with the sex question, representations regarding which, submitted by the public educational and medical authorities, had been referred to the Commission for observations.

Table L.

Numbers at Ages 15–64 *per Thousand of Total Population.*

	1860–61.	1870–71.	1880–81.	1890–91.	1900–01.	1910–11.	1920–21.	1930–31.
Sweden	612·9	605·1	615·1	590·2	591·9	598·5	623·1	659·5
England and Wales	597·2	591·6	589·7	601·9	629·1	641·5	662·4	687·5

The Swedish figures relate to the end of the years 1860, 1870, etc., the English to the Census dates.

These figures are, I think, worth attention, and the future of the numbers of the active population may be worthy of no less concern than the future of the numbers of the total population. It has the advantage that we can see into the immediate future with somewhat greater assurance in respect of this part than is possible for the whole of the population. To illustrate from the Swedish figures, the numbers under 15 were 335 per thousand of the population in 1860, and had fallen to 248 per thousand in 1930, while the numbers over 65 had risen from 52 per thousand in 1860 to 92 per thousand in 1930. Having regard to the generally greater consumption needs of the people at working ages than at other ages, the increase of the active

Table M.

Survivals at Ages 15–64 *at Decennial Periods* (*Sweden*).

(In cols. (*a*), (*b*), (*c*) and (*d*) the figures represent thousands.)

Period.	Births. (*a*).	Deaths in First Year of Life. (*b*).	Remainder. (*c*).	Year.	No. at Ages 15-64. (*d*).	Per Thousand Surviving. From (*a*) (*e*).	From (*c*) (*f*).
1796–1845	4,353	770	3,583	1860	2,365	543·4	660·1
1806–55	4,689	788	3,901	1870	2,522	537·9	646·7
1816–65	5,213	815	4,398	1880	2,808	538·8	638·5
1826–75	5,582	839	4,743	1890	2,824	505·9	595·4
1836–85	5,988	840	5,148	1900	3,040	507·7	591·9
1846–95	6,358	844	5,514	1910	3,305	519·8	600·8
1856–1905	6,625	810	5,815	1920	3,679	555·4	632·7
1866–1915	6,669	730	5,939	1930	4,051	607·4	682·0
1876–1925	6,584	630	5,954	1940	(*e*) *3,999** (*f*) *4,061**		
1886–1935	6,147	515	5,632	1950	(*e*) *3,734** (*f*) *3,836**		

* The figures here given are calculated as if the rates of survival determined for 1930 remained, without increase or decrease, valid for 1940 and 1950.

population indicated in the preceding table may go far to offset the decrease in the remainder, even if, in mere numbers, the grand aggregate decreases. The conditions of survival, in fact, are important as well as the numbers who enter on the race. What has happened in respect of the active share in Sweden is shown in Table M, which sets out the figures of proportions surviving from the total numbers born during the periods whose births could have contributed to those survivals.

It will be observed that the largest figure in Column (*a*) of the table is that for the births of 1866–1915, whose survivors would be over 15 and under 65 years of age in 1930. The actual maximum was 6,691,335 births in the fifty years ended 1912. The numbers between 15 and 65 years of age had, however, not ceased to increase with the cessation of increase in the flow at the fountain-head. How long, and by how much, the survival proportion may increase cannot be stated with confidence. The numbers of births from which the present population at the ages in question is derived decreased very slowly at first, and, if the survival proportion should be larger in 1940 than in 1930, the active population will have suffered little decrease, even if it has not increased. The proportion of survivors in 1933 was very nearly 64 per cent., and the same proportion in 1940 would mean an active population greater by 155,000 than in 1930. It seems to be within the range of the probable that this figure should be reached or surpassed, and further that, even should the rise that has been in progress since about 1890 pass its climax before 1950, the figure may not have fallen below the 66 per cent. that will leave an active population as great as that of 1930.

The consideration that the rate of infantile mortality in the first year of life has been falling up to the present time (it was little short of 200 per thousand births in Sweden in the last decade of the eighteenth century and about 100 in the 'nineties of our own memories, and is now below 50) appears to have a bearing on the case. Column (*f*) of the table shows the rate of survival from those who passed the first anniversary of their birth. If we suppose the figure shown for 1930 to apply to 1940, the active population in that year will exceed that of 1930, but an increase to nearly 720 per mille would be needed to ensure a similar situation in 1950. The actual maximum of the figures in Column (*c*) was reached for the fifty years ended 1921 with a total of 5,989,000, corresponding to the survivors at the end of 1936. If the survival rate exceeded 676 per mille, the fall of the active population, if, indeed, it had begun to fall, would not have reduced the survivors in 1940 below their total in 1930.

In using the term "survivors," changes due to any balance of migration have been ignored. For the half-century preceding 1930 the recorded increase of population has, for each successive quinquennium, fallen short of the recorded natural increase.

The actual distribution of populations by ages is the result, not only of the conditions of the present time, but of the conditions of many past periods, as well as of the inherited characteristics of the population and their physical environment. This does not aim at being a very exact, and still less an exhaustive statement. But I have wondered whether such a statistical summary of current conditions as is provided by a comparison with our own Life Tables of those relating to such countries as I have been considering might not be worth making. Our attention is attracted, from time to time, to data relating to special factors in the problem of survival, and the possibility of understanding some of the problems we have to study a little better by examining statistics which bear the impress of our conditions of life seems not to be excluded. I have prepared Table N in an attempt at getting a set of figures not too numerous to be incapable of reasonably ready comprehension. The diagram will, I think, facilitate their apprehension. I should have preferred life tables for identical periods, but regarded the Swedish and Danish tables for the period 1926–30 as preferable to any others for a post-war period that have been officially published.

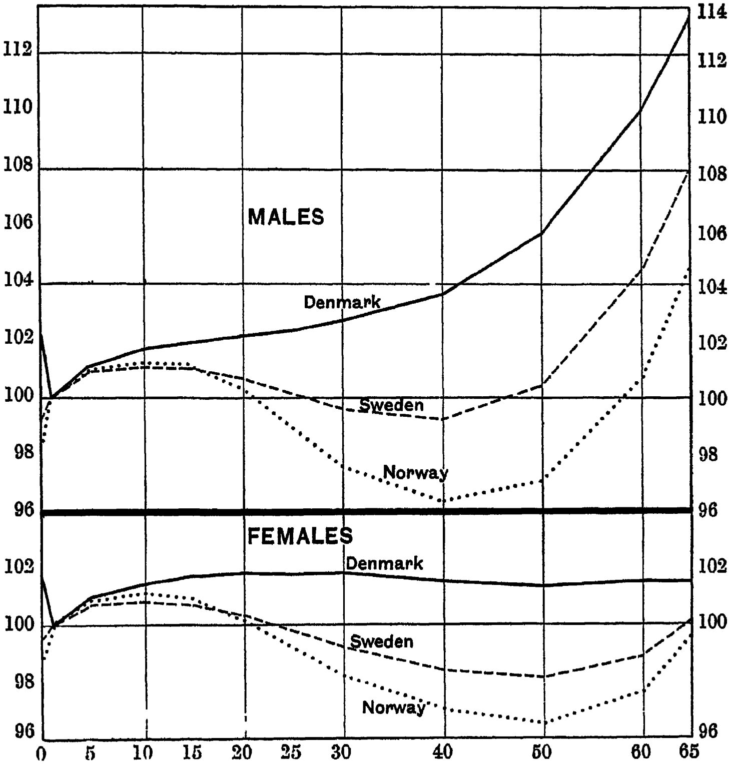
That the Norwegian life table available related to the complete decade 1921–30, including the years immediately following the close of the war, was, in my opinion, not a sufficient reason for taking that period for all three countries.

TABLE N.

Proportions of Survivors, from Equal Numbers passing age 1, to Corresponding Data for England and Wales.

Age.	Males.			Females.		
	Sweden, 1926–30.	Norway, 1921–30	Denmark, 1926–30.	Sweden, 1926–30.	Norway, 1921–30.	Denmark, 1926–30.
0	99·2	98·2	102·1	99·6	98·9	101·0
1	100	100	100	100	100	100
5	100·9	101·1	101·1	100·8	101·0	101·0
10	101·1	101·3	101·5	100·9	101·2	101·4
15	101·0	101·2	101·7	100·8	101·0	101·7
20	100·7	100·4	102·0	100·4	100·3	101·8
25	100·2	99·0	102·2	99·8	99·2	101·8
30	99·7	97·7	102·5	99·2	98·3	101·8
40	99·3	96·5	103·4	98·5	97·1	101·5
50	100·4	97·2	105·6	98·2	96·6	101·4
60	104·2	100·6	109·9	98·9	97·7	101·5
65	108·0	104·4	113·4	100·3	99·6	101·5

So far as survival rates of the female populations are concerned, the deviations of all of them from the proportions of survival shown by our latest official life table, the No. 10, based on the statistical data for 1930–32 relating to England and Wales, are, for the most part, not large within the limit of the age 65. The Danish table in particular, except at the very beginning, is strikingly parallel with the English. The rates of mortality in the first year of life were lower in both Norway and Sweden than here at home, while the Danish showed, on the other side, a deviation greater in absolute magnitude than that of either of its two neighbours. The position for the later periods of active life appears to be most favourable in Denmark, in spite of the bad start which has attracted comment. This more favourable experience extends to both sexes. In the middle period of



Comparative frequencies of survival after the first year of life in the Scandinavian countries (about 1930) as percentages of the frequencies in England and Wales. (Figures for ages above 65 not shown.)

life the experience in Sweden, and still more in Norway, appears to have been relatively unfavourable. The course of the figures relating to males in Sweden approaches almost as closely, as far as age 50, that for England and Wales as do the figures for females in Denmark.

The most remarkable feature of the table and chart is, however, as it catches the eye, the relatively more favourable experience for males in Scandinavia than in England and Wales. In Sweden the contrast in the proportion of males surviving beyond 65 is greater than in Norway, and in Denmark greater than in Sweden. That is true for life tables based on the ten years 1921–30 as well as for those utilized in the table.

In concentrating attention on the life tables, and their reflection of the conditions of survival at the period to which they relate, the actual age-distributions, as recorded in the Census, must not be lost sight of. The following shows the proportions recorded for 1930–31.

TABLE O.

Proportions per Thousand in Age-Groups.

	Males per 1,000 at all ages.			Females per 1,000 at all ages.			Females per 1,000 Males.		
Ages .. .	0–14.	15–64.	65–.	0–14.	15–64.	65–	0–14.	15–64.	65–.
Sweden ...	257·2	658·9	83·9	239·8	660·1	100·1	963	1,035	1,233
Denmark ..	283·9	647·8	68·3	265·9	656·7	77·4	979	1,059	1,185
Norway ...	298·0	627·5	74·5	272·7	636·4	90·9	962	1,066	1,282
England and Wales ..	251·3	682·2	66·5	226·8	692·0	81·2	980	1,105	1,328

It will be noted that, in proportion to the total male population, and also in proportion to the total female population, the English figure for persons of 65 years of age and over was lower than the corresponding figures for Norway and for Sweden. The Danish figures were also lower than those of either of the countries of the Scandinavian peninsula, a contrast to the position shown by the life tables for the current rates of survival. The Danish proportion over 65 was less for females and only slightly greater for males than that of England and Wales. In all three age-groups the English proportion of females to males exceeded all the Scandinavian figures.

The differences between the relative proportions of the Censuses of 1930–31 and those of the life tables for periods ending with, or including, the Census dates, are important. To bear in mind that fact may be useful in the formation of economic policy or even in the enunciation of economic doctrine.

The modern stress on so-called dynamic economics seems at some points to view the problems of to-day from an angle that has some resemblance to treating population data as if the life-table point of view were wholly adequate without regard to the Census data. Neither of the expressions of the conditions affecting the numbers of the people can be considered adequate by itself. The Census data show the conditions of the moment to which they relate, the life table indicates the tendencies towards modification, and the comparative strength of those tendencies.

In concluding, I should like to express my great indebtedness to many from whom I have received much valued help, and particularly to the Statistical Department in Copenhagen and the Central Statistical Bureau in Oslo. I could not have hoped to escape wasting so much time as to make it impossible to present a paper in the current Session but for the guidance of my good friends in these offices, and the facilities afforded me. For this help I am deeply grateful.

DISCUSSION ON SIR ALFRED FLUX'S PAPER.

MR. H. LEAK: It gives me very great pleasure to have the privilege on behalf of the Society of proposing this vote of thanks to our distinguished ex-President, who, owing to his now residing in Denmark, honours us all too infrequently with his presence at our meetings and his contributions to our debates. Thanks are due also to the Executive Committee, for they, it appears, planted the seed which has borne such good fruit to-night. We must thank Sir Alfred for giving us this interesting insight into Scandinavian statistics, the points of similarity, the points of variance, and the recent work done in those countries on statistical matters.

The Scandinavian countries have certainly produced some economic statistics not paralleled in this country—for example, the consumption price index of the Swedish Riksbank, a monthly index of production, and a census of establishments covering not only manufacture, but also wholesale and retail trade, transport, finance and entertainment. We have some very good railway transport statistics, but we know extremely little about the transport of goods by road. Mr. Rowson gave to this Society in a recent paper some interesting statistics of the cinema industry, but I should very much like to know whether the guess which I have to make annually of the net amount we pay to the United States and elsewhere for our entertainment is substantially accurate. As regards wholesaling and retailing, the results of a few limited inquiries are available, but nothing on a national basis. These are gaps in our knowledge of the economic life of this country, and I feel envious at times of the statistics which some other countries can find the money to produce. Some of my colleagues in the Dominions have a definite advantage, in that they have a general Statistics Act, and so do not need to go to Parliament on each occasion when they want to collect information on a compulsory basis. Sir Alfred has referred to one case in point—namely, the absence of specific information about the wages bill in connection with our Census of Production. I should like to have an amending Act dealing with that matter, but it is difficult to secure Parliamentary time for a measure of that kind, unless no opposition to it can be guaranteed.

There is one thing of importance which I should like to say in connection with the volume and value index numbers mentioned by Sir Alfred Flux. I have recently had to compare the volume of oversea trade in 1935 relative to 1930 at the average values recorded in 1930 and in 1935, and the result has been rather striking. For every class of imports and exports—food, drink and tobacco, raw materials and manufactures—and for most groups in those classes, the volume, when measured at 1935 prices, is lower than when estimated at 1930 prices. The generality of this change, coupled with a very similar result when the change was made from 1924 prices to 1930 prices, led me to wonder whether there was any reason for an upward bias in the volume index. This is not a divergence which will affect only our index numbers, but it has some applicability to those Swedish index numbers given by Sir Alfred, because both are compiled from the same kind of material and are aggregative index numbers. Now, though such index numbers are not reversible, they have not any natural bias in either direction, so that if there is anything in what I think, it must be due either to the nature of the material or to the relationship of the two years. The result cannot be ascribed to the lower price level, as the same result is found when the series is calculated in the reverse direction. Again, if the apparent bias had only arisen since 1930, it might have been assumed that the rather abnormal price structure of that year was responsible. I am therefore led to suspect that the bias is inherent in the material, and I venture, with some diffidence, to put forward a suggestion on this point which, if unsound, will quickly be criticized by subsequent speakers with a greater knowledge of statistical theory than I possess, or will be disposed of as fallacious by Sir Alfred Flux when he comes to reply.

Consider the case of imports. At any given time some goods may be over-valued, and if they are over-valued, they will tend to be imported in smaller quantities than normal. Importers will hold off in the hope of a fall. Dyed cotton goods will tend to replace printed goods if the latter become relatively too high in price, or the cotton prints may be replaced by piece-goods containing artificial silk. Similarly, manufacturers will decide to carry on with an old machine rather than replace it with a new one. If this is true, for any year there will tend to be a make-up of trade consisting of a larger proportion of goods which are relatively low in price and a smaller proportion of goods relatively high in price. Thus, if these goods are valued at the prices of another year—the base year—the exaggerated quantities will be multiplied by a higher price, and the diminished quantities by a lower price, resulting in a higher aggregate if prices have remained stable, or a higher relative aggregate if there has been a change in the price level. This applies also to the price series. If this is calculated from the volume series, it will have a downward bias. If, on the other hand, it is calculated direct, it will, equally with the volume series, have an upward bias. This is a matter of real importance in connection with the Swedish index which is calculated by the chain method, because, if my suggestion has anything in it, there is a possibility of an upward bias every year, possibly becoming serious after a time. I have used the word "bias," but I do not intend to suggest that there is necessarily any increase in the divergence year by year, unless the index is compiled by the chain method. The divergence of 1935 on 1930 when calculated at the average values of the two years will not necessarily be greater than the divergence for 1934 or 1933. My suggestion merely is that the divergence which is likely owing to the index not being reversible will tend to be always in the one direction. This is a theory on which I should be very glad to have views, and Sir Alfred Flux's views in particular. If any Fellows can throw light on this subject, I shall be very grateful, as I want to know if I am sound or unsound in this suggestion.

I had hoped to say something about the monthly index of production, but I will limit myself to one question. In calculating the index numbers per working day, is each day in the week given an equal value, or if Saturday be a half-day in Scandinavia, is it treated as half a day? Also, is allowance made for production in some industries being continuous, *e.g.* the production of pig iron, and in other industries, possibly for a total closing on one week day?

There are many other points in this paper on which I should have liked to comment, but time is getting on, and I will conclude by moving that a very cordial vote of thanks be given to Sir Alfred Flux for his most interesting paper.

MR. GLENDAY: It is a real pleasure to join in welcoming back amongst us Sir Alfred Flux, and to find that his sojourn in a strange land has neither impaired his interest in trade statistics nor blunted his powers of acute analysis.

I do not propose to venture any comment on the actual statistical material in this most valuable paper, beyond expressing our indebtedness to Sir Alfred for making available such interesting data regarding the economic welfare of the Scandinavian countries. I am particularly impressed by the very great interest taken by the manufacturers of those countries in the compilation of statistical indices; I cannot help contrasting it with the apparent lack of zeal in such matters shown by British manufacturers. There is still a fear in certain sections of British industry lest information may be distorted and used for purposes for which it is not intended, and so convey false information; the publications of certain of our younger academic statisticians have unfortunately helped to lend colour to that suspicion. Nevertheless, so far as the compilation of industry's own internal statistics are concerned, considerable progress has undoubtedly been made in recent years. Provided the matter is properly handled I have no doubt that industry's more effective collaboration in official statistical compilations will be secured. For many of these are ceasing to be of academic interest only. As an example I may quote the question raised on pp. 233–4—namely, whether the basis adopted for a country's foreign trade statistics should be the country where the financial settlement is made, or the country of origin or of last consignment. This is a matter of the greatest practical importance because, as most of you are aware, in these days, trade is tending to become more and more bilateral in character—that is, to take the form of an exchange of goods for goods. Anything which Sir Alfred Flux can do to speed up the adoption of the second basis by Scandinavian countries will help in promoting good relations with this country.

I must, however, confess to a certain scepticism regarding the practical value of many of the *aggregate* indices employed in Sir Alfred's paper, especially when they are used to study trade movements or to institute comparisons between countries. I notice, for example, that on p. 248 he makes a comparison between the net output of Norway and the net output of this country. I find myself quite unable to attach any meaning to such a comparison. It seems to me that if the comparison concerns one particular industry in two countries, it may have some meaning, but to compare the *aggregate* net outputs of two countries may lead to highly misleading conclusions unless their economic patterns are the same.

I hope Sir Alfred will not think it is a criticism of his paper or of the valuable work he has done, if I say that I cannot help feeling it would have been helpful if he had included in his paper a brief summary of the industrial and commercial patterns of his three countries.

I should like to know more about the Swedish index of consumption compiled by the Riksbank. Its purpose, I understand, was to enable the bank to pursue a policy of keeping the price-level stable. I do not know whether Sir Alfred has any views on that, but a recent issue of the Swedish *Index* contained a supplement by Richard Lester which implied that the consumption Index, as a practical instrument, had not been of any great value.

I should also very much welcome Sir Alfred's view on the value of *aggregate* indices of employment, production and prices in helping us to control business fluctuations. I notice he refers to them in this connection. I can appreciate the practical value of population figures, since they are not mere aggregates but take account of the "arrangement" of the constituent units (*e.g.* age distribution), and this allows us to employ probabilities in making forecasts of the future.

May I illustrate what is in my mind by referring to a problem which is agitating industrial opinion in this country to-day? You will find some people asserting that we are at the beginning of a boom; others believe we are near the peak; others, again, retort that it is absurd to speak of a boom at all when there are still 1,600,000 workers registered as unemployed, according to the *aggregate* unemployment returns.

The reply to those in the third class is that aggregate statistics are useless as a guide in this respect. To discover the true position, you must study the "arrangement" of the units composing the aggregate. If you do this, as Sir William Beveridge has recently, you will find that it is quite possible to have an acute shortage in industries of the type which tend to become over-expanded in a boom period, and a large surplus elsewhere which, owing either to age, over-specialization in another trade, or other reasons, cannot be made available to fill the shortage quickly enough—if at all.

I should also like to ask Sir Alfred whether he can tell us whether the industrialists in Sweden and the other Scandinavian countries are devoting special attention to the relation of actual to potential production, with a view to checking unsound expansion in boom periods.

I hope that nothing I have said will be taken by Sir Alfred as implying criticism of his paper; on the contrary, my observations are a tribute to the great interest of the subject he has chosen for his discourse this evening.

It gives me great pleasure to second the vote of thanks proposed by Mr. Leak.

The Vote of Thanks was put to the Meeting and carried unanimously.

DR. PERCY STOCKS said that many fascinating problems for the vital statistician were raised in the last portion of Sir Alfred Flux's paper, and he would like to refer to one in connection with Table N and the diagram on p. 263, which showed the proportions of survivors to various ages from age one. He had often wondered whether it would be practicable to make official reports on mortality statistics more cheerful reading by speaking, like Sir Alfred, in terms of survival rates rather than of death rates, but the figures in Table N had made him realize how very unsatisfactory from the point of view of health propaganda such a method would be. To take, for example, the much-discussed maternal mortality rate, at present about four deaths to one thousand confinements. Suppose that next year, through the discovery of some effective cure of septicæmia, the rate were reduced to two per thousand, one could picture the newspaper headlines—" Maternal death rate reduced by one half." On the other hand, supposing the method of Table N were adopted, the headline, if any, would read, " Mother's chance of surviving childbirth increased by one-fifth of one per cent."

On looking at Table N, his first thought was that something had gone wrong either with the calculations therein, or with those in a recent table comparing Scandinavian and other death rates at various ages with those in England and Wales in 1930–32 to be found on p. 157 of the text of the *Registrar General's Statistical Review* for 1934. The latter table showed, for example, that the Norwegian death rates of children aged 1–5 were less than half those in England and Wales, and the Swedish rates only a little over one half.

Having the details available, he had recalculated the Norwegian survival rates for males, based on age 1, as in Table N, using 1930–32 —the same years as for England and Wales, since the difference of some 5 years whilst death rates were declining contributed a little to the apparent discrepancy. The 1930–32 male figures for Norway expressed as percentages of the corresponding rates for England and Wales would be as follows :—

At age 0	97·9
,, ,, 1	100
,, ,, 5	101·6
,, ,, 10	102·0
,, ,, 15	101·9
,, ,, 20	101·7
,, ,, 25	100·9
,, ,, 30	100·0
,, ,, 40	99·2
,, ,, 50	100·5
,, ,, 60	105·3
,, ,, 65	110·1

The Swedish male figures up to 20 for 1930–32, calculated on the same basis, ran as follows :—

At age 0	98·8
1	100·0
5	101·4
10	101·7
15	101·7
20	101·5

But when one came to express the probabilities, in 1930–32 for a boy, of dying between the various ages as percentages of the same chances of dying in England and Wales, it would be found that in Norway the male infant mortality rate was 72 per cent. and the chance of dying between the first and fifth birthday was only 47 per cent. of that in England and Wales, although the survival rate from 1 to 5 showed an excess of only 2 per cent. The chance of dying between 5 and 10 for a Norwegian boy was 72 per cent., and between 10 and 15, 92 per cent., of the corresponding chance for an English boy. From 15 to about 40 the chances of dying for males were in excess, and then fell below those in England and Wales up to the end of life. For a Swedish boy the infant mortality rate was 85 per cent., the chance of dying between 1 and 5 was 55 per cent., between 5 and 10, 73 per cent., and between 10 and 15, 91 per cent. of the corresponding probability for a boy in this country.

Dr. Stocks said he gave these figures because it seemed to him that the form of expression used in Table N might be rather misleading to the ordinary reader, unless the percentages were accompanied by figures giving either the actual rates of survival or the rates of mortality.

Professor Greenwood said he rose chiefly to greet his old friend and colleague, Sir Alfred Flux, and to say how glad they all were to see him back again.

The first part of the paper was entirely beyond his ken. He could but recall with thankfulness, when he heard the horrid fate of some who made index numbers with incomplete materials, that he had never trespassed on the well-cultivated field of the Board of Trade.

There was another small point: his old friend Sir Alfred had done him a little bit more than justice. He thought the large number of Fellows of the Society who had never read, and who had no intention of reading, his valedictory address might draw the conclusion that he had discussed Swedish mathematical statistics in that address. He *had* alluded to two vital statisticians who had carried out a very elaborate attempt at testing a particular pair of hypotheses, and had said that although they used algebra, they explained exactly what they meant by it, but that was hardly a summary of Scandinavian mathematical statistics.

It was very difficult not to say something about the last part of the paper, because this question of Scandinavian vital statistics was an old love of his. Thirteen years ago he had read a paper on this subject to the Society, and that had not been the first paper on Scandinavian statistics read to the Society. The cogent remarks made by Dr. Stocks might be summarized by pointing out that the difference between the Scandinavian mortality and that of England and Wales had long been known to be a relative superiority in mortality rates at later childhood and adolescent age, and a great inferiority in rates of mortality at ages past middle life. That was not an absolute peculiarity of the Scandinavian countries, because Dr. Stevenson had pointed out that if one contrasted the relatively agricultural parts of England with the urban parts, the same result would be found. An industrial country had a relatively or absolutely favourable mortality in later childhood and adolescence, and an unfavourable mortality in middle age and older. That was still true of a comparison between Scandinavia and England and Wales.

There was, however, a suggestion in the more recent figures that, relatively, the Scandinavian countries were gaining upon us, *i.e.* retaining their superiority at later ages and losing their inferiority at adolescence and young manhood or womanhood. There was here material for profitable study, and it was good that Sir Alfred had found room in his survey to call attention to it.

Sir Alfred Flux, in reply, said: I should like to say a word or two and to express my great personal satisfaction at being back among my old friends and colleagues. They have been good enough to say a corresponding word to me, and I can assure them that if they find any satisfaction in seeing me back again, I have at least an equal satisfaction, if not a greater one, at being able to see them again.

With reference to Mr. Leak's problem in the matter of the changes in volume of imports and exports, a precise answer would not only involve lengthened calculations, but would also need to take into account the character of the changes in composition of various complex groups of commodities gathered under one designation. Unless some information were available regarding the latter point, I could only guess at the answer to Mr. Leak's question. It might possibly be that, in a period during which prices of raw materials tended downwards, the prices of more or less finished goods would fall less than those of the materials used in their manufacture, and changes in the direction of increased proportions of less highly to more highly manufactured goods in a composite heading might result in tendencies to change in the same direction such as those noted by Mr. Leak. But I have no general answer apart from any knowledge of the particular circumstances of the problem to be examined. I will try to look into the question if sufficient detail is available.

On the subject of working days, weeks of seven working days would give 7000 men-days for each 1000 of persons employed, *i.e.* each 1000 of the average of daily numbers. Whether Saturday (or Sunday) were worked or not would not affect the counting of the men-days. Where three shifts provided for continuous working, similarly, the number of men-days would be 21,000 in a week, in which 1000 were employed (on average) throughout the week. If continuous production did not call for a staff of constant numbers, the number who put in a day's work within the limits of 24 hours could, of course, be ascertained from properly kept records. I am glad to note the sympathetic attitude of Mr. Glenday in the matter of increased co-operation by employers in providing statistical knowledge of features of vital importance to industry. I have been able to give the changes so far announced in the recording of foreign trade by the countries concerned, which, I hope, will be extended until all of them are again using the same methods. I hope there will not be a reversion to the purchase and sale basis, but I trust Mr. Glenday will not credit me with any influence in promoting or hindering such action.

As to the broad comparison of certain industrial averages in Norway and in Great Britain, I think the divergences from the averages which mark the separate constituents of the aggregates in the two countries are not such as would render wholly misleading the broad comparison I have ventured to make. The principle thus indicated might, perhaps, be extended to some of the other comparisons to which Mr. Glenday alluded.

I had prepared tables containing figures showing the industrial structure of each of the three countries, but I omitted them from the paper, in view of the length to which their inclusion would have stretched it. As to the consumption-price index prepared for the Swedish Riksbank, it would not follow that it was of no value because the need for it as a guide to action had not yet arisen. I am not aware whether it has arisen or not. But the future might bring occasions when the availability of this index might become of much greater importance than at any time since its compilation was begun.

Mr. Glenday has invited my opinion on a rather broad topic, the utility of aggregate indices of employment, of production, and of prices as aids to the control of business fluctuations. Should not the answer be that, in so far as changes in any or all of these three features of our organization are compensatory, questions relating to the advantages or disadvantages of having expansion at certain points and contraction simultaneously at others can only be examined by the use of some of the details which go to make up the aggregate? In so far as the changes are not compensatory, the variations of the aggregate indices serve to direct attention to the lack of balance, and to stimulate enquiry as to its causes. Blind reliance on a uniform interpretation of changes in these and other economic indices does not seem likely to ensure wise action.

I am inclined to conclude that the industrialists of Scandinavia are not lending their assistance to the formation and study of records, and of indices of changes in the rates of progress, of the main industries without an expectation that such study will prove helpful in laying their plans for future development. Beyond such a general conclusion I am unable to provide an answer to Mr. Glenday's question.

With reference to the very interesting contribution of Dr. Stocks, I may say that I have made use of the life tables prepared by the official statisticians and actuaries in the three countries specially considered. The tables in the Registrar General's Review for 1934 had escaped my attention, and I am glad Dr. Stocks introduced this material. Reference to p. 262 would show that I felt the desirability of using tables referring to the same epoch in all the countries compared.

The use of three-year averages, however, did not appear to offer adequate guarantee that the results would be representative of average conditions. Had the paper not been already a long one, I should have included comparisons with pre-war data. For the first decade of the present century, the contrast shown between the course of male and female survival rates is very notably less than that for the more recent periods, while the use of a three-year basis (1910–12) for England and Wales in place of the ten-year average (1901–10) in the calculation modified the figures in the direction of those used in the paper. The comparison of 1901–10 with the quinquennium commencing 25 years later suggests an approximation of survivals here among females to the experience of Scandinavia, not matched by the changes recorded for males. The order shown in the diagram, Denmark, Sweden, Norway, in the figures for males, also characterizes those earlier data. A comparison between the three countries was what I was concerned to present, and the comparison with England and Wales was incidental to this. Perhaps mean figures for Scandinavia should have been used rather than figures relating to another region, but that would have required a life table other than those officially prepared and published.

As a result of the ballot taken during the meeting Mr. Alwyn Harris was elected a Fellow of the Society.

WHOLESALE PRICES IN 1936.

By THE EDITOR OF "THE STATIST."

(*The Statist's* Index Numbers in continuation of
Mr. A. Sauerbeck's figures.)

THE Sauerbeck-*Statist* index numbers of wholesale prices are set out in the following table. The annual averages are shown for every year since 1846 (that is, from the commencement of the calculations), and Jevons's figures for the years 1810 and 1818, adjusted to Sauerbeck's standard, are also included. These all-commodities index numbers embrace forty-five commodities, and are calculated, with few exceptions, from the average of fifty-two weekly quotations for each commodity, the averages for the standard period 1867–77 being taken as 100. Up to the end of 1912 the compilation of the statistics was made by Mr. Augustus Sauerbeck, and subsequently by *The Statist.*

THE STATIST'S *Annual Index Numbers (in continuation of Sauerbeck's figures)*

(1867–77 = 100.)

Year.	Average No.	Year.	Average No.	Year.	Average No.	Year.	Average No.	Year.	Average No.
1936	88	1917	175	1898	64	1879	83	1861	98
'35	84	'16	136	'97	62	'78	87	'60	99
'34	82	'15	108	'96	61	'77	94	1859	94
'33	79	'14	85	'95	62	'76	95	'58	91
'32	80	'13	85	'94	63	'75	96	'57	105
'31	83	'12	85	'93	68	'74	102	'56	101
'30	97	'11	80	'92	68	'73	111	'55	101
'29	115	'10	78	'91	72	'72	109	'54	102
'28	120	1909	74	'90	72	'71	100	'53	95
'27	122	'08	73	1889	72	'70	96	'52	78
'26	126	'07	80	'88	70	1869	98	'51	75
'25	136	'06	77	'87	68	'68	99	'50	77
'24	139	'05	72	'86	69	'67	100	1849	74
'23	129	'04	70	'85	72	'66	102	'48	78
'22	131	'03	69	'84	76	'65	101	'47	95
'21	155	'02	69	'83	82	'64	105	'46	89
'20	251	'01	70	'82	84	'63	103	'18	159*
1919	206	'00	75	'81	85	'62	101	'10	171*
'18	192	1899	68	'80	88				

* Jevons's numbers adjusted.

For the year 1936 the annual index number is 88, compared with 84 for the previous year and 82 for 1934. Thus there was an accentuation last year in the upward movement of prices which began to show itself during 1934. Since the post-war nadir, reached in 1933, the annual index number has risen by about 11 per cent. Last year it rose by nearly 5 per cent. over the 1935 figure. It should, however, be remarked that the rise in the average level of prices was entirely confined to the second half of the year, so that the annual index tends to under-estimate the change which had come about by the end of 1936. As the table on the next page shows, the monthly all-commodities index number, though it had been 86·7 at the beginning of the year, was only 84·4 for June, but by December it had risen to 98·6—a rise of nearly 17 per cent. in the six months. During the present year the upward movement has gone further, and the February index was 101·7. Thus the prolonged period during which the range of fluctuation was very restricted has now given way to a phase of rapidly rising prices.

THE STATIST'S *Annual Index Numbers—ten-year averages* (1867–77).

1838–1847 = 93
'48– '57 = 89
'58– '67 = 99
'68– '77 = 100
'78– '87 = 79
'88– '97 = 67
'90– '99 = 66
'91–1900 = 66
'92– '01 = 66
'93– '02 = 66
'94– '03 = 66
'95– '04 = 67
'96– '05 = 68
'97– '06 = 70
'98– '07 = 71

1899–1908 = 72
'00– '09 = 73
1901– '10 = 73
'02– '11 = 74
'03– '12 = 76
'04– '13 = 77
'05– '14 = 79
'06– '15 = 82
'07– '16 = 88
'08– '17 = 98
'09– '18 = 110
'10– '19 = 123
'11– '20 = 146
'12– '21 = 148
'13– '22 = 153

1914–1923 = 157
'15– '24 = 162
'16– '25 = 165
'17– '26 = 164
'18– '27 = 159
'19– '28 = 152
'20– '29 = 142
'21– '30 = 127
'22– '31 = 120
'23– '32 = 115
'24– '33 = 110
'25– '34 = 104
'26– '35 = 99
'27– '36 = 95

In general, industrial and monetary conditions both helped to induce the upward movement in 1936. The internal trade recovery continued to gather momentum, and implied an intensified demand for those industrial materials included in the index number and, *via* increased wage-rolls, for foodstuffs of most descriptions. Superimposed, that is, on the additional demand resulting from traders' and manufacturers' decisions to replenish their stocks, now fallen too low in relation to the quickened economic activity, there was an increase in total wage costs and in the power of the working classes to consume. But during the first half of 1936 these factors did not produce any rise in the average of prices, and it was not, in fact, until the last quarter of the year that the inevitable advance became pronounced. In large measure this emphatic rise in the last three months of 1936 (and in the present year to date) was caused by rearmament expenditure and anticipations of its intensification.

Monthly Fluctuations of the Index Numbers of 45 Commodities, 1867–77 = 100.*

	Jan.	Feb.	March	April	May	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
1888	70·9	70·6	69·9	69·8	68·1	67·4	69·0	70·1	71·9	72·4	72·7	73·2	70
'93	68·4	69·0	68·1	67·4	67·4	67·4	67·7	67·1	68·2	68·6	67·8	67·0	68
1894	65·8	65·0	64·3	63·8	63·1	63·1	62·6	63·0	62·7	61·7	60·8	60·1	63
'95	60·0	60·0	60·8	61·7	62·5	62·4	62·8	63·3	63 5	63·3	62·3	61·2	62
'96	61·4	61·4	60·7	60·3	60·1	59·3	59·2	59·7	61·2	62·6	62·6	62·0	61
'97	62·0	61·9	61·9	61·5	61·2	61·3	61·7	63·2	63·4	62·7	62·4	62·4	62
'98	62·8	63·4	63·0	65·5	66·4	64·7	64·3	64·0	63·9	63·6	63·9	63·8	64
1899	65·4	65·8	65·6	66·1	66·6	66·9	67·9	68·3	70·0	71·5	71·6	72·3	68
1900	74·0	75·1	75·7	75·6	75·5	75·7	76·2	76·0	75·5	74·7	73·9	73·4	75
'01	72·2	71·7	71·0	70·6	70·5	69·8	69·5	69·8	69·6	69·6	69·0	68·4	70
'02	68·8	68·9	69·2	69·7	70·9	70·4	70·0	69·5	69·3	68·8	68·6	69·1	69
'03	69·5	70·2	70·4	69·4	69·6	69·5	69·5	70·0	69·1	69·0	69·0	70·0	69
1904	70·4	70·8	70·8	70·5	69·9	69·4	69·9	70·4	70·7	71·0	71·2	70·9	70
'05	71·2	71·4	71·8	72·0	71·7	72·0	72·5	72·3	72·4	73·2	74·2	74·9	72
'06	75·2	75·0	75·7	76·5	77·0	76·9	76·4	76·7	77·5	78·5	78·6	79·7	77
'07	80·0	80·7	80·0	80·7	82·4	82·0	81·1	79·4	79·1	78·8	76·7	76·2	80
'08	76·0	74·5	74·1	73·8	73·6	72·9	73·1	72·2	72·5	72·2	72·2	72·3	73
1909	72·0	71·9	72·4	74·3	75·4	75·1	75·2	74·9	74·7	75·2	75·5	76·3	74
'10	77·1	78·1	79·1	78·5	78·2	76·9	78·1	78·2	77·6	77·2	77·8	77·9	78
'11	78·5	78·6	78·9	80·0	80·3	80·0	78·9	79·5	80·3	80·7	80·6	80·9	80
'12	81·8	82·9	84·4	85·0	85·3	85·5	86·5	85·9	86·7	85·8	85·3	86·4	85
'13	86·4	86·1	86·7	86·2	85·7	84·1	84·2	85·0	85·7	84·5	83·3	83·8	85
1914	83·5	83·8	82·8	82·3	82·3	81·2	82·4	87·9	89·3	89·8	88·8	91·6	85
'15	96·4	100·9	103·7	105·9	107·2	106·4	106·4	107·0	107·8	110·0	113·1	118·4	108
'16	123·6	127·0	130·4	134·2	135·4	131·0	130·5	134·5	134·4	141·5	150 8	154·3	136
'17	159·3	164·0	169·0	173·0	175·0	180·4	176·9	175·7	176·4	180·6	182·9	185·1	175
'18	186·2	187·3	188·0	189·8	191·1	192·3	192·9	195·9	197·1	197·8	195·3	196·0	192
1919	192·1	187·5	184·7	184·6	194·6	199·4	206·4	212·7	214·8	224·3	231·0	235·2	206
'20	245·3	260·4	261·8	266·1	260·0	255·7	254·6	253·5	248·7	239 9	223 8	207·2	251
'21	197·2	183·0	177·2	169·8	162·2	155·8	158·2	154·3	149·4	138·4	136·7	133·6	155
'22	132·5	132·2	133·3	134·8	135·5	135·6	134·0	129·6	127·9	130·1	130 6	129·1	131
'23	130·2	131·9	132·7	134·0	132·2	127·9	124·8	125·0	127·8	127·7	132·4	133·2	129
1924	137·2	138·8	137·0	136·8	136·4	136·3	138·4	138 0	141·3	146·1	145·5	147·7	139
'25	144·8	143·1	140·1	137·5	135·7	131·2	134·3	134·3	132·7	130·2	132·9	130·4	136
'26	129·3	127·9	126·1	125·5	125·7	124·9	126·0	127·0	128·0	131·0	130·8	123·9	126
'27	123·1	124·1	123·6	123·3	123·8	123·1	122·0	122·8	121 5	120·6	121·5	121·4	122
'28	120·9	121·1	123·6	125·6	126·2	122·0	120·3	118 0	116·8	116·8	117·9	117·9	120
1929	117·0	120·1	120·5	116·5	113·0	113·1	115·2	113·9	112·6	111·1	108·3	108·8	115
'30	106·6	104·8	103·0	101·5	98·8	95·8	94·4	92·2	90·8	90·4	88·6	86·9	97
'31	85·7	85·5	85·5	84·4	82·2	82·6	80·2	79·1	80·7	82·3	83·0	85·4	83
'32	84·7	86·7	84·1	82·5	80·2	77·0	78·9	80·7	80·4	77·8	77·9	77·7	80
'33	77·8	77·0	77·0	78·5	80·9	81·3	81·7	81·2	80·7	80·5	79·3	80·0	79
1934	82·5	82·5	82·2	81·0	81·1	80·7	82·4	83·4	82·1	81·1	81·0	82·8	82
'35	83·6	83·4	82·9	84·1	85·2	83·7	84·3	84·1	85·1	85·8	86·3	86·7	84
'36	86·7	86·7	86·4	85·8	85·2	84·4	86 8	88·7	90·1	91·4	94 2	98 6	88
'37	99·2	101·7											

---

* The average of the twelve monthly figures of each year does not necessarily coincide with the annual figures, as the latter are calculated mostly from the average of 52 weekly quotations, while the former are based on end-of-the-month prices.

And it is not to be counted a coincidence that the devaluation of the former gold bloc currencies immediately preceded the sharp rise in prices, for these over-valued currencies had exercised a deflationary pull on the price level.

All the various influences on the demand side were reinforced by factors on the supply side. In the case of most commodities, production and productive capacity had been diminished during preceding years, partly through the normal process of economic attrition, but largely through regulation by Government or re-

Summary of Index Numbers. Groups of Articles, 1867–77 = 100.

	Vegetable Food (Corn, etc.).	Animal Food (Meat, etc.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials.	Grand Total.	Silver.*	Wheat Harvest.†	Average Price of Consols.‡	Average Bank of England Rate.‡
												£	Percent.
1873......	106	109	106	107	141	103	106	114	**111**	97·4	80	92½	4·750
1896......	53	73	59	62	63	54	63	60	**61**	50·5	112	110¾	2·483
1911......	70	90	61	75	93	76	81	83	**80**	40·4	110	$79\frac{5}{16}$	3·467
1912......	78	96	62	81	110	76	82	88	**85**	46·1	97	$76\frac{5}{32}$	3·776
'13......	69	99	54	77	111	84	83	91	**85**	45·3	105	$73\frac{21}{32}$	4·771
'14......	75	100	58	81	99	81	87	88	**85**	41·6	109	$72\frac{1}{16}$	4·038
'15......	108	126	70	170	126	92	109	108	**108**	38·9	106	65½	5·000
'16......	133	152	86	130	158	129	136	140	**136**	50·4	97	$58\frac{1}{40}$	5·470
1917......	177	192	113	169	172	192	174	179	**175**	65·8	102	54⅜	5·15
'18......	168	207	130	174	192	222	202	206	**192**	76·4	111	56⅞	5·0
'19......	179	213	147	185	220	228	219	222	**206**	85·3	98	$54\frac{1}{12}$	5·166
'20......	227	263	198	234	295	262	244	264	**251**	76·1	96	$47\frac{1}{60}$	6·71
'21......	143	218	83	158	181	140	145	153	**155**	48·1	118	$47\frac{23}{32}$	6·092
1922......	107	184	82	130	142	134	124	132	**131**	51·6	105	$56\frac{15}{32}$	3·692
'23......	98	162	101	122	155	140	117	134	**129**	49·4	105	$57\frac{31}{64}$	3·496
'24......	119	158	105	130	158	170	120	146	**139**	50·7	107	$56\frac{37}{64}$	4·0
'25......	118	162	89	128	154	165	119	143	**136**	52·5	114	56⅜	4·575
'26......	108	150	88	119	154	133	114	131	**126**	47·1	99	$54\frac{29}{32}$	5·0
1927......	108	138	83	114	141	131	118	129	**122**	42·8	109	$54\frac{39}{64}$	4·650
'28......	107	142	78	114	123	136	117	124	**120**	44·0	109	$55\frac{13}{16}$	4·5
'29......	99	146	72	110	126	122	111	119	**115**	40·2	114	$54\frac{5}{16}$	5·508
'30......	77	142	54	96	112	84	97	97	**97**	29·0	99	56	3·4
'31......	68	119	50	83	100	63	65	82	**83**	20·4	99	$55\frac{7}{16}$	3·975
1932......	72	105	50	79	99	64	81	81	**80**	19·5	105	$66\frac{13}{32}$	3·017
'33......	60	106	47	74	107	67	80	83	**79**	18·7	114	$73\frac{23}{32}$	2·0
'34......	63	108	50	77	109	72	80	85	**82**	20·0	120	$80\frac{31}{32}$	2·0
'35......	66	107	42	76	112	80	83	90	**84**	26·4	112	86½	2·0
'36......	76	109	41	81	118	83	86	94	**88**	18·5	100	$85\frac{11}{64}$	2·0
Average 1904–13	68	91	53	73	95	74	76	81	**77**	44·1	106	$82\frac{25}{32}$	3·733
1890–99	61	80	63	68	71	56	66	64	**66**	55·8	103	$103\frac{9}{16}$	2·958
'78–87	79	95	76	84	73	71	81	76	**79**	82·1	97	$99\frac{9}{16}$	3·264
1818–27	109	90	151	111	128	105	106	112	**111**	98·0	—	—	3·692

* Silver (see note on p. 282), parity of 1 gold to 15½ silver = 100.

† Wheat harvest in U.K. to 1895: 29 bushels = 100; from 1896: 30 bushels = 100.

‡ Average price of Consols and the average Bank of England rate of discount are actual figures, not index-numbers; Consols 3% to 1888, 2¾% from 1889, 2½% from April, 1903.

striction by agreement among producers. Not only is there some reluctance rapidly to expand output on the upward phase of demand, but there is a degree of technical inelasticity in supply resulting from the long period of slackened production. Moreover, at such a time the excessive stocks which existed during the depression have

THE STATIST'S *Index Numbers—monthly averages by groups* (1867–77 = 100).

	Vegetable Food.	Animal Food.	Sugar, Tea, and Coffee.	Foodstuffs.	Minerals.	Textiles.	Sundry Materials.	Materials.	All Commodities
1934.									
Jan. ...	59·6	111·8	52·6	**77·3**	111·2	72·9	80·1	**86·2**	**82·5**
Feb. ...	59·7	111·3	53·2	**77·3**	111·5	73·9	79·3	**86·3**	**82·5**
March ...	58·8	107·3	53 1	**75·5**	112·5	74 0	80 4	**87·0**	**82 2**
April ..	57·8	107·8	52·8	**75·2**	110·5	70·8	79·6	**85·2**	**81·0**
May ...	58·2	113·3	52·5	**76·6**	107·8	71·1	79·4	**84·5**	**81·1**
June ...	60·1	109·8	51·3	**76·6**	106·8	70·6	78·4	**83·6**	**80·7**
July ...	70·4	109·8	49·4	**80·5**	107·3	71·1	77·9	**83·7**	**82·4**
Aug. ...	72·6	111·9	47·7	**81·8**	108·5	71·5	78·9	**84·6**	**83·4**
Sept. ..	70·1	106·9	47·0	**78·8**	109·8	69·6	79·4	**84·5**	**82·1**
Oct. ...	67·7	106·2	44·9	**77·1**	109·7	67·2	79·9	**84·0**	**81·1**
Nov. ...	66·7	104·4	44·8	**75·9**	109·4	71·2	78·8	**84·7**	**81·0**
Dec. ..	65·7	111·2	44·6	**78·0**	109·9	74·4	80·1	**86·4**	**82·8**
1935.									
Jan. ...	64·6	112·7	42·2	**77·6**	110·1	77·1	81·6	**87·9**	**83·6**
Feb. ...	64·5	112·0	40·7	**77·0**	107·4	77·8	83·3	**88·0**	**83·4**
March ..	64·0	108·9	40·9	**75·7**	109·1	77·2	82·9	**88·2**	**82·9**
April ...	65·4	108·8	42·6	**76·6**	112·0	78·8	83·0	**89·6**	**84·1**
May ...	70·1	108·1	42·6	**78·3**	113·4	79·6	83·1	**90 2**	**85·2**
June ...	65·7	106·9	41·7	**75 8**	111·6	79·7	82·3	**89·4**	**83·7**
July ...	68·9	105·4	40·1	**76·3**	114·4	80·5	81·6	**90·1**	**84·3**
Aug. ..	67·5	108·3	39·8	**76·7**	111·9	81·5	81·1	**89·5**	**84·1**
Sept. ...	70·1	106·0	41·8	**77·4**	115·2	78·4	84·2	**90·8**	**85·1**
Oct. ...	70·6	104·4	42·7	**77·1**	116·4	80·7	85·1	**92·2**	**85·8**
Nov. ...	69·2	103·9	41·6	**76·1**	117·4	85·3	85·0	**93·4**	**86·3**
Dec. ...	72·3	104·1	41·2	**77·4**	116·2	85·8	84·5	**93·3**	**86·7**
1936.									
Jan. ...	73·4	104·8	41·9	**78·4**	114·0	84·9	84·5	**92·8**	**86·7**
Feb. ...	71·9	104·9	41·0	**77·6**	116 9	84·1	85·1	**93·3**	**86·7**
March ...	71·0	104·1	40·8	**76·8**	116·6	84·7	84·8	**93·3**	**86·4**
April ...	73·4	102·3	40·9	**77·2**	116·7	81·4	84·4	**92·1**	**85·8**
May ...	71·2	108·7	39·6	**78·3**	114·7	79·1	82·7	**90·2**	**85·2**
June ...	69·1	110·4	38·5	**77·9**	112·7	77·7	82·7	**89·3**	**84·4**
July ...	69·3	114·0	38·9	**79·4**	114·5	80·7	86·2	**92·2**	**86·8**
Aug. ...	76·4	112·1	39·1	**81·7**	115·6	79·6	90·4	**93·9**	**88·7**
Sept. ...	80·3	111·8	39·4	**83·3**	119·9	81·1	89·5	**95·1**	**90·1**
Oct. ...	83·9	111·2	40·8	**84·9**	122·8	84·7	87·6	**96·1**	**91·4**
Nov. ...	84·0	110·5	41·9	**84·9**	129·9	87·6	92·3	**101·0**	**94·2**
Dec. ...	89·6	110·5	45·0	**87·9**	136·2	92·4	97·7	**106·4**	**98·6**
1937.									
Jan. ...	91·3	108·1	46·2	**88·0**	134·5	95·9	98·5	**107·4**	**99·2**
Feb. ...	91·1	111·5	46·7	**89·3**	144·8	96·1	99·9	**110·8**	**101·7**

*Quarterly Movements of Prices.**

Summary of Index Numbers, 1867–77 = 100.

Years.	Quarters.	Vegetable Food (Corn, etc.).	Animal Food (Meat, etc.).	Sugar, Coffee, and Tea.	Total Food.	Minerals.	Textiles.	Sundry Materials.	Total Materials.	Grand Total.	Silver.†
1925	I	129·0	165·6	98·8	136·1	157·0	171·6	123·9	147·5	**142·7**	51·6
	II	116·6	164·8	86·7	128·1	150·5	157·8	119·8	139·7	**134·8**	51·5
	III	112·6	163·3	83·5	125·2	153·9	159·2	117·3	140·1	**133·8**	53·3
	IV	108·9	155·1	82·6	120·4	153·7	159·8	114·5	139·0	**131·2**	53·1
'26	I	103·9	152·4	86·8	118·1	150·3	148·8	147·7	134·8	**127·8**	50·6
	II	104·1	155·0	88·4	119·5	148·0	135·7	113·7	129·7	**125·4**	49·3
	III	106·8	154·2	88·2	120·3	166·1	126·4	114·1	131·9	**127·0**	47·4
	IV	109·3	144·4	88·9	117·9	192·0	115·8	115·9	136·4	**128·6**	41·2
'27	I	108·1	143·4	85·4	116·1	155·0	120·7	118·3	128·9	**123·6**	43·0
	II	111·6	145·9	82·6	118·1	140·7	127·9	118·2	127·2	**123·4**	43·0
	III	106·9	138·1	80·8	112·9	133·3	139·8	118·1	128·8	**122·1**	42·1
	IV	104·5	132·1	82·0	110·0	132·8	138·6	120·6	129·5	**121·2**	43·3
'28	I	108·9	143·8	80·3	115·7	123·6	136·7	120·6	126·3	**121·9**	43·2
	II	118·0	152·0	81·1	122·8	122·9	140·6	117·9	126·3	**124·8**	44·7
	III	101·1	142·0	77·9	111·2	121·0	135·3	116·7	123·6	**118·4**	44·3
	IV	101·9	138·1	76·3	109·8	126·0	131·5	115·3	123·5	**117·5**	43·7
'29	I	102·9	142·7	75·4	111·8	130·2	130·7	116·6	124·6	**119·2**	42·8
	II	92·8	148·3	73·2	109·1	125·0	121·2	111·1	117·9	**114·2**	41·1
	III	99·9	143·4	71·7	110·0	126·9	115·6	111·1	116·7	**113·9**	39·6
	IV	91·3	145·2	64·2	105·4	122·9	107·9	108·7	112·3	**109·4**	37·3
'30	I	80·8	152·1	58·3	102·3	121·1	96·4	104·9	106·7	**104·8**	33·0
	II	76·7	142·4	56·5	96·5	110·8	92·4	99·5	100·4	**98·7**	29·8
	III	77·4	132·1	48·6	91·5	109·0	77·3	94·6	94·6	**92·5**	26·8
	IV	71·9	130·0	51·7	89·0	105·4	68·9	91·6	88·3	**88·6**	26·5
'31	I	69·0	127·3	48·6	86·2	103·4	62·7	89·8	85·1	**85·6**	21·8
	II	69·5	123·3	48·8	85·0	98·6	61·4	85·6	81·7	**80·1**	21·3
	III	70·0	117·4	47·0	81·4	98·5	58·6	81·6	79·0	**83·0**	21·9
	IV	75·7	107·9	53·7	82·9	102·2	66·9	85·4	84·1	**83·6**	21·5
'32	I	80·7	109·2	52·2	83·2	101·1	67·5	87·8	85·2	**85·2**	21·0
	II	77·6	107·6	50·2	82·9	95·1	59·4	79·6	77·3	**79·9**	19·4
	III	68·2	105·3	49·6	77·9	100·6	65·9	80·7	81·5	**80·0**	19·4
	IV	64·2	98·2	48·4	73·4	101·2	64·5	80·2	81·0	**77·8**	18·4
'33	I	60·2	106·0	47·3	74·4	99·7	62·0	79·1	79·4	**77·3**	18·2
	II	59·1	108·4	47·4	74·8	109·7	68·7	79·8	84·2	**80·2**	20·0
	III	62·0	105·8	47·9	75·2	111·0	71·0	80·0	85·6	**81·2**	18·5
	IV	58·5	106·4	47·4	73·8	110·9	67·7	79·7	84·4	**79·9**	18·5
'34	I	59·4	110·1	53·0	76·7	111·7	73·6	79·9	86·5	**82·4**	19·1
	II	58·7	110·3	52·2	76·1	108·4	70·8	79·1	84·4	**80·9**	18·6
	III	71·0	109·5	48·0	80·4	108·5	70·7	78·7	84·3	**82·6**	19·7
	IV	66·7	107·3	44·8	77·0	109·7	70·9	79·6	85·0	**81·6**	22·1
'35	I	64·4	111·2	41·3	76·8	108·9	77·4	82·6	88·0	**83·3**	23·0
	II	67·1	107·9	42·3	76·9	112·3	79·4	82·8	89·8	**84·3**	29·3
	III	68·8	106·6	40·6	76·8	113·8	80·1	82·3	90·1	**84·5**	27·3
	IV	70·7	104·1	41·8	76·9	116·7	83·6	84·9	93·0	**86·3**	25·7
'36	I	72·1	104·6	41·2	77·6	116·1	84·6	84·8	93·1	**86·6**	18·2
	II	71·2	107·1	39·7	77·8	114·7	79·4	83·3	90·5	**85·1**	18·6
	III	75·3	112·6	39·1	81·5	116·7	80·5	88·7	93·7	**88·5**	18·6
	IV	85·8	110·7	42·6	85·9	129·6	88·2	92·5	101·2	**94·7**	18·9

---

* The averages of the four quarterly figures to each year do not necessarily coincide with the annual averages, as the latter are based as far as possible on average weekly prices. See also the *Journal*, 1893, p. 221; 1895, p. 144; 1901, p. 90; and 1909, p. 70.

† Silver, parity of 1 gold to 15½ silver = 100.

been reduced to sub-normal limits and the rise in prices is thereby reinforced.

The all-commodities index is made up of two groups—food and materials—and each group comprises three sections. The annual group and sectional indices, together with the all-commodities index, are set out in the table on page 277; on p. 278 is a table giving the monthly indices since the beginning of 1934, and on the following page quarterly movements are given.

An increase occurred last year in five of the six sectional indices, and also in the great majority of the indices for the component items. Among vegetable foods, oats was the only commodity of which this was not true. The increase in wheat and flour prices was particularly marked, the bad harvests both at home and in important producing countries abroad accentuating the other factors making for a rise. Maize prices similarly were influenced by bad harvests. The price of potatoes continued the rising tendency, already well-marked as a result of regulated production and restricted imports; the size of the crop was little different from that of the previous year. The animal food section showed a smaller proportional rise in prices than any section except sugar, coffee and tea, and quotations declined in the second half of the year. Mutton was on average cheaper in 1936 than in 1935, but beef, pork, bacon and butter were dearer. The third section of the food group—sugar, coffee and tea—was the only section the annual index of which declined; this result was due to the fall in the indices for coffee and tea. In consequence of these changes in the foodstuffs sections, the index number for the group as a whole moved up from 76 for the year 1935 to 81 for last year. In the materials group, the outstanding changes occurred among the items of the first section—the minerals. It was in this section that the most direct effects of rearmament were seen, copper and lead being particularly affected last year in this respect, while at the same time both industrial demand and the supply conditions in these and other commodities (such as iron and coal) stimulated the upward movement in prices. Tin, which with the other base metals has become much dearer in the current year, was, on average, cheaper last year than in 1935, though at the end of 1936 the price was higher than at the corresponding period of 1935. This metal had been subject to some uncertainty regarding a possible breakdown of the restriction scheme. Wool prices were, on average, substantially higher in 1936, the re-stocking process leading to pressure on supplies. There were increases in the prices of the other textiles, except cotton and flax, but since the end of the year those two commodities have been conspicuous participants in the general price trend. Of the sundry materials, hides became much dearer and the Spanish civil war resulted in a stringency in supplies of olive oil, with a consequent rise in prices. The increase in timber prices, though it had begun by the end of the year, did not suffice to raise the year's average for this commodity above the 1935 level; since the end of the year, the increase has become accentuated. As a result of the advance in the three sections, the materials group index rose from 90 for the year 1935 to 94 for the year 1936. At the end of this article, on pages 286–91, the average prices and index numbers for all the commodities comprised in *The Statist* combined index number are given for the period since 1916; the figures for 1873 are also shown, and average prices for four ten-year periods.

Construction of the Tabular Statements.

The following table illustrates the method of construction of the index numbers. The index numbers here given are based on the average prices for the eleven years 1867–77. Take, for instance, the *Gazette* price of English wheat:—

	s.	*d.*	
Average, 1867–77 ...	54	6	= 100, average point.
.. 1914	35	0	= 64, or 36 per cent. *below* the average point.
,, 1920 .	80	7	= 148, ,, 48 ,, *above*
,, 1926 ..	53	3	= 98, ,, 2 ,, *below*

The individual index numbers, therefore, represent simple percentages of the average point.

The articles are grouped in six categories:—

		1867–77. Total Numbers.	Example for 1936.	
			Total Numbers.	Average.
1. Vegetable food, corn, etc. (wheat flour, barley, oats, maize, potatoes, and rice) ...	8 Index nos.	800	606	76
2. Animal food (beef, mutton, pork, bacon, and butter) ...	7 ,,	700	763	109
3. Sugar, coffee, and tea	4 ,,	400	162	41
1—3. *Food*	19 ,,	1,900	1,531	81
4. Minerals (iron, copper, tin, lead, and coal)	7 ,,	700	825	118
5. Textiles (cotton, flax, hemp, jute, wool, and silk) ...	8 ,,	800	664	83
6. Sundry materials (hides, leather, tallow, oils, soda, nitrate, indigo, and timber) ...	11 ,,	1,100	951	86
4—6. *Materials*	26 ,,	2,600	2,440	94
General Average	45 ,,	4,500	3,971	88

The general average is drawn from all forty-five descriptions, which are treated as of equal value, and is the simple arithmetical mean as shown above.

Index of Silver Prices.

The base of the index numbers given below is 1 gold to 15½ silver = 100, 60·84*d.* per standard ounce being parity.*

	Price per oz. standard.	Index number.		Price per oz. standard.	Index number.
	d.			*d.*	
Average 1873 ...	59¼	=97·4	*Lowest* Nov., 1902	21$\frac{11}{16}$	=35·6
„ '90–99...	34	=55·8	End Dec., 1906 ...	32$\frac{5}{16}$	=53·1
„ 1917–26...	40½	=66·6	„ Dec., '08 ...	23$\frac{3}{16}$	=38·1
„ 1893 ...	35⅝	=58·6	„ Dec., '12 ...	29	=47·7
„ '96 ...	30¾	=50·5	„ Dec., '13 ...	26$\frac{9}{16}$	=43·7
„ 1909 ...	23$\frac{11}{16}$	=38·9	„ June, '14 ...	26	=42·7
„ '14 ...	25$\frac{5}{16}$	=41·6	„ Dec., '14 ...	22$\frac{11}{16}$	=37·3
„ '15 ...	23$\frac{11}{16}$	=38·9	„ Dec., '15 ...	26¼	=43·1
„ '16 ...	31$\frac{5}{16}$	=50·4	„ Dec., '16 ...	36½	=58·7
„ '17 ...	40⅞	=65·8	„ Dec., '17 ...	43½	=70·0
„ '18 ...	47½	=76·4	„ Dec., '18 ...	48$\frac{7}{16}$	=77·9
„ '19 ...	57	=85·3	„ Dec., '19 ...	77¼	=98·3
„ '20 ...	61$\frac{9}{16}$	=76·1	„ Dec., '20 ...	40⅞	=49·2
„ '21 ...	36⅞	=48·1	„ Dec., '21 ...	34⅝	=49·3
„ '22 ...	34$\frac{7}{16}$	=51·6	„ Dec., '22 ...	31$\frac{9}{16}$	=49·6
„ '23 ...	31$\frac{15}{16}$	=49·4	„ Dec., '23 ...	33$\frac{7}{16}$	=49·0
„ '24 ...	34	=50·7	„ Dec., '24 ...	31$\frac{11}{16}$	=50·4
„ '25 ...	32⅛	=52·5	„ Dec., '25 ...	31$\frac{11}{16}$	=52·1
„ '26 ...	28$\frac{11}{16}$	=47·1	„ Dec., '26 ...	25	=41·1
„ '27 ...	26$\frac{1}{32}$	=42·8	„ Dec., '27 ...	26½	=43·6
„ '28 ...	26¾	=44·0	„ Dec., '28 ...	26⅜	=43·3
„ '29 ...	24$\frac{7}{16}$	=40·2	„ Dec., '29 ...	21$\frac{7}{16}$	=35·2
„ '30 ...	17$\frac{11}{16}$	=29·0	„ Dec., '30 ...	14$\frac{7}{16}$	=23·7
„ '31 ...	14⅜	=20·4	„ Dec., '31 ...	20$\frac{7}{16}$	=21·6
„ '32 ...	17$\frac{13}{16}$	=19·5	„ Dec., '32 ...	16½	=17·2
„ '33 ...	18⅛	=18·7	„ Dec., '33 ...	19$\frac{1}{16}$	=19·5
„ '34 ...	21$\frac{7}{32}$	=20·0	„ Dec., '34 ...	24⅜	=22·6
„ '35 ...	29	=26·4	„ Dec., '35 ...	22½	=20·6
„ '36 ...	20$\frac{1}{16}$	=18·5	„ Dec., '36 ...	21$\frac{3}{16}$	=19·4

---

* All the index numbers in the table from 1916 to 1925 inclusive and from 1931 to date are calculated on the basis of the gold prices of silver instead of the sterling prices, though the latter are the price quotations given in the table. In arriving at the index numbers for these dates the prices of gold are taken as follows. For 1916, 1917 and 1918 the price is taken as 86*s.* 9½*d.* per fine oz., derived from the "pegged" New York rate of $4·76½ to the £. For 1919 the average price of gold is taken as 93*s.* 4¼*d.*, this being the parity price with the U.S. dollar, the average New York exchange in that year being $4·429. For the other dates the index numbers are based on the quotations in the London market for exportable gold. The quotation at the end of 1919 was 109*s.* 8¼*d.* per fine oz. At the end of 1920, 1921, 1922, 1923 and 1924 the quotations per fine oz. were 116*s.* 1*d.*, 98*s.* 0*d.*, 88*s.* 11*d.*, 95*s.* 4*d.*, and 88*s.* 2*d.* respectively and the average quotations in these years were 112*s.* 11½*d.*, 107*s.* 0½*d.*, 93*s.* 4*d.*, 90*s.* 3*d.*, and 93*s.* 8¼*d.* respectively, while the average price in 1925 was 85*s.* 5½*d.* The prices at the end of 1931, 1932, 1933, 1934, 1935 and 1936 were 121*s.* 11*d.*, 123*s.* 9*d.*. 126*s.* 6*d.*, 141*s.* 0*d.*, 141*s.* 2*d.* and 141*s.* 7*d.* respectively, and the average prices in these years were 92*s.* 6¼*d.*, 118*s.* 0¾*d.*, 124*s.* 10½*d.*, 137*s.* 7¾*d.*, 142*s.* 1¼*d.* and 140*s.* 3½*d.* respectively.

World's Production of Silver (in millions of ounces).

	United States.	Mexico.	Canada.	Australia.	Other Countries.	Total.
1902... ...	55·5	60·2	4·3	8·0	34·8	162·8
'03... ...	54·3	70·5	3·1	9·7	30·1	167·7
'04... ...	57·7	60·8	3·7	14·5	27·5	164·2
'05... ...	56·1	65·0	5·9	15·0	30·3	172·3
'06... ...	56·5	55·2	8·5	14·2	30·6	165·0
'07... ...	56·5	61·0	12·8	19·0	34·8	184·2
'08... ...	52·4	73·6	22·1	17·2	37·8	203·1
'09... ...	54·7	73·9	27·5	16·3	39·7	212·1
'10... ...	57·1	71·4	32·9	21·5	38·8	221·7
'11... ...	60·4	79·0	32·7	16·6	37·5	226·2
'12... ...	63·8	74·6	31·6	18·1	36·2	224·3
'13... ...	66·8	70·7	31·5	3·5	51·4	223·9
'14... ...	72·4	27·5	28·4	3·6	36·5	168·4
'15... ...	74·9	39·5	28·4	4·1	37·3	184·2
'16... ...	74·4	38·2	25·4	4·2	26·6	168·8
'17... ...	71·7	35·0	22·2	10·0	35·3	174·2
'18... ...	67·8	62·5	21·2	10·0	35·9	197·4
'19... ...	56·7	62·7	15·7	7·4	32·0	174·5
'20... ...	55·5	66·8	12·6	7·5	33·0	175·4
'21... ...	53·1	64·5	13·1	4·9	35·7	171·3
'22... ...	56·2	81·1	18·6	11·3	46·3	213·5
'23... ...	73·3	90·9	17·8	10·3	50·2	242·5
'24... ...	65·3	91·5	19·7	10·8	52·2	239·5
'25... ...	66·1	92·9	20·2	11·1	54·8	245·1
'26... ...	62·7	98·3	22·4	11·2	59·0	253·6
'27... ...	60·4	104·6	22·7	9·0	57·3	254·0
'28... ...	58·4	108·5	21·9	9·0	59·5	257·3
'29... ...	61·2	108·7	23·1	9·0	59·7	261·7
'30... ...	51·0	105·0	26·0	8·9	57·1	248·0
'31... ...	31·0	86·0	21·0	7·6	47·4	196·0
'32... ...	24·0	69·0	18·0	6·5	47·5	165·0
'33... ...	22·8	68·1	15·2	11·0	52·0	169·1
'34... ...	32·5	74·1	16·4	10·8	56·6	190·4
'35... ...	45·6	75·6	16·6	11·4	66·7	215·9
'36* ...	63·0	81·0	19·0	87·0		250·0

* Provisional.

As the table shows, the average price of silver was considerably lower in 1936 than in the previous year. This was mainly owing to the fact that, as from December, 1935, purchases by the United States Treasury in the London market were restricted. There was, however, spasmodic buying from this quarter during the year, and this often sufficed to prevent more serious declines in prices. World production was considerably higher than in 1935, as is indicated in the table above.

Gold.—The table below shows the world's annual gold production since 1850. Prior to 1911 the estimates are those of the Bureau of the U.S. Mint and other authorities. The value is taken throughout at £4·25 per fine oz. The estimate for 1936 is subject to revision. The figures show clearly the increase in output caused by the departure of the large producing countries from the gold standard (especially the departure of South Africa at the end of 1932).

(000's omitted.)

Year.	Value of output. £	Year.	Value of output. £
1850	11,600	1894	37,229
'51	17,200	'95	40,843
'52	26,550	'96	41,559
'53	31,090	'97	48,509
'54	25,490	'98	58,949
'55	27,015	'99	63,027
'56	29,520	1900	52,312
'57	26,655	'01	53,630
'58	24,930	'02	60,975
'59	24,970	'03	67,337
'60	23,850	'04	71,380
'61	22,760	'05	78,143
'62	21,550	'06	82,707
'63	21,390	'07	84,857
'64	22,600	'08	90,995
'65	24,040	'09	93,302
'66	24,220	'10	93,544
'67	22,805	'11	94,930
'68	21,945	'12	95,783
'69	21,245	'13	97,481
'70	21,370	'14	92,709
'71	25,400	'15	97,114
'72	24,200	'16	92,597
'73	23,600	'17	87,236
'74	22,950	'18	78,605
'75	22,700	'19	73,078
'76	22,540	'20	68,522
'77	23,830	'21	67,848
'78	22,020	'22	66,723
'79	21,400	'23	77,888
'80	22,130	'24	81,807
'81	21,150	'25	82,267
'82	20,500	'26	82,211
'83	20,640	'27	82,582
'84	20,830	'28	82,400
'85	21,250	'29	83,200
'86	21,430	'30	88,500
'87	21,735	'31	95,100
'88	22,644	'32	103,400
'89	25,375	'33	107,700
'90	24,421	'34	117,400
'91	26,846	'35	131,700*
'92	30,134	'36	148,700
'93	32,363		

* Amended figure.

*Average Prices of Commodities.**

No. of Article	0	1	2	3	4	5	6	7	8	1–8	9	10
		Wheat.		Flour.	Barley.	Oats.	Maize.§	Potatoes.‖	Rice.	Vegetable Food.	Beef.‡	
Year.	Silver.†	English *Gazette.*	American.	Town Made white (now "G.R.").	English *Gazette.*	English *Gazette.*	American Mixed.	Good English.	Rangoon Cargoes to Arrive.	Total.	Prime.	Middling.
	d. per oz.	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per sack (280 lbs.).	*s.* and *d.* per qr.	*s.* and *d.* per qr.	*s.* per qr.	*s.* per ton.	*s.* and *d.* per cwt.		*d.* per 8 lbs.	*d.* per 8 lbs.
1873 ...	59¼	58·8	63	51	40·5	25·5	30	160	9·6	—	65	56
1916 ...	31 5/16	58·5	67·7	52½	51·7	33·5	52¾	153½	16·10	—	81¼	76¾
'17 ...	40⅞	75·9	83·3	58½	64·10	51·7	71¾	186½	25·3	—	104½	101
'18 ...	47½	72·9	78·7	46¾	59·0	49·3	78⅖	142¾	26·2	—	103	103
'19 ...	57	72·10	74·10	46¾	75·8	52·3	78⅘	198½	25·10	—	108	108
'20 ...	61 9/16	80·7	92·4	66	90	57·4	90⅔	242½	41·10	—	125	125
'21 ...	36⅞	72·9	73·9	64½	54·4	34·5	38⅓	198	18·5	—	115	109⅞
'22 ...	34 7/16	47·10	52·11	45¾	40·1	29·1	31¼	130	14·10	—	88⅝	82
'23 ...	31 15/16	42·2	47·3	39½	33·8	26·8	36	101	14·10	—	79¼	74½
'24 ...	34	49·3	53·9	43⅚	46·9	27·2	39⅔	186	16·9	—	82⅛	76⅛
'25 ...	32⅛	52·2	62·4	50⅛	42·0	27·2	38 9/16	154	16·0	—	80	73½
'26 ...	28 11/16	53·3	58·9	49¼	36·11	25·1	29 13/16	127	16·3	—	74	67
'27 ...	26 1/32	49·3	58·3	44 9/16	42·0	25·4	30 9/16	136	15·11	—	70	62
'28 ...	26¾	44·8	50·10	40⅙	39·0	29·0	38 13/32	133	15·0	—	74	66½
'29 ...	24 7/16	42·2	51·3	38½	35·5	24·7	36¼	111	14·3	—	71	66
'30 ...	17 11/16	34·3	36·10	33 1/12	28·3	17·2	23	93	13·0	—	73	68
'31 ...	14⅜	24·0	25·1	22⅞	28·0	17·8	15 9/16	146	9·8	—	67	61
'32 ...	17 27/32	25·0	27·5	24 7/32	27·1	19·3	18 13/16	152	9·8	—	65	59
'33 ...	18⅛	22·10	25·7	23 29/32	28·7	15·10	17 1/16	86	7·9	—	61	52
'34 ...	21 7/32	20·2	28·0	23⅛	30·11	17·5	19 19/32	97	7·8	—	58	52
'35 ...	29	22·2	31·1	25¾	28·7	18·9	17¼	107	8·10	—	54	49
'36 ...	20 1/16	30·9	35·1	31 17/32	29·5	17·8	19½	146	9·0	—	54	50
Average 1904–13	26¾	31½	36	30	25½	18½	24½	78	7¾	—	51	44½
1890–99	34	28½	31½	27½	25½	17½	19½	72	6¼	—	47	37⅛
'78–87	50	40	43½	34½	31½	21	25	102	8	—	55½	46
'67–77	58½	54½	56	46	39	26	32½	117	10	—	59	50

Index Numbers (or Percentages) of Prices, the Average of 1867–77 being 100.

Year	0	1	2	3	4	5	6	7	8	1–8	9	10
1873 ...	97·4	108	113	104	104	98	92	137	95	851	110	112
1916 ...	50·4	107	121	114	132	128	163	131	168	1,064	138	154
'17 ...	65·8	139	149	127	166	199	221	160	252	1,413	177	202
'18 ...	76·4	134	140	102	151	190	241	122	262	1,342	174	207
'19 ...	85·3	134	134	102	194	201	242	170	258	1,435	183	216
'20 ...	76·1	148	165	143	231	221	279	207	418	1,812	212	250
'21 ...	48·1	133	132	140	139	132	118	169	184	1,147	195	220
'22 ...	51·6	88	95	100	103	112	96	111	148	853	150	164
'23 ...	49·4	77	84	86	86	103	111	86	148	781	134	149
'24 ...	50·7	90	96	95	120	105	122	159	167	954	139	152
'25 ...	52·5	96	111	109	108	105	119	132	160	940	136	147
'26 ...	47·1	98	105	107	95	96	92	109	163	865	125	134
'27 ...	42·8	90	104	98	108	97	95	116	159	867	119	124
'28 ...	44·0	82	91	87	100	112	118	114	150	854	125	133
'29 ...	40·2	77	91	84	91	95	112	95	143	788	120	132
'30 ...	29·0	63	66	72	72	66	71	79	130	619	124	136
'31 ...	20·4	44	45	50	71	68	48	125	93	544	114	122
'32 ...	19·5	46	49	53	69	74	58	130	93	572	110	118
'33 ...	18·7	42	46	52	73	61	53	74	78	479	103	104
'34 ...	20·0	37	50	50	79	67	60	83	77	503	98	104
'35 ...	26·4	41	56	56	73	72	53	91	88	530	92	98
'36 ...	18·5	56	63	69	75	68	60	125	90	606	92	100

---

* The annual prices are the average monthly or weekly quotations, except potatoes, which are the average weekly quotations during the eight months January to April and September to December.

† Not included in the general average. ‡ Meat (9—13), by the carcase, in the London Central Meat Market.

§ La Plata from 1924.

Average Prices of Commodities—Contd.

No. of Article	11	12	13	14	15	9–15	16A	16B	17	18A	18B	18
	Mutton.		Pork.	Bacon	Butter		Sugar			Coffee		
Year.	Prime *d* per 8 lbs.	Middling *d* per 8 lbs.	Large and Small, average *d* per 8 lbs.	Waterford. *s* per cwt	Friesland, Fine to Finest *s* per cwt	Animal Food Total	British West Indian Refining || *s* per cwt	Beet, German, 88 p.c., f.o.b. *s* per cwt	Java, Floating Cargoes § *s* per cwt	Ceylon Plantation, Low Middling † *s* per cwt	Rio, Good *s* per cwt.	Mean of 18A and 18B
1873 ...	71	63	54	81	123	—	22½	25	28	100	86	—
1916 ...	93½	86½	87¾	109¾	191	—	24¼	22¾‡	26½	77¾	50	—
'17 ...	114⅗	109[illegible]	110[illegible]	148	216	—	31½	25⅜‡	32¾	94[illegible]	58	—
'18 ...	109⅕	109[illegible]	128⅘	183	247	—	33	26½‡	35½	128	69	—
'19 ...	114	114	128	190[illegible]	252	—	38[illegible]	34[illegible]‡	43½	145¾	114⅞	—
'20 ...	144⅔	144⅔	168¼	239⅔	301	—	58	65½‡	74¾	148	111½	—
'21 ...	130⅞	125¼	121⅘	179	250	—	19½	18½‡	22	120¾	63	—
'22 ...	125	121⅔	101	145⅓	202½	—	15	14⅛	15[illegible]	120⅔	74⅓	—
'23 ...	114⅜	107¾	89	113¾	186	—	25½	23⅓	24⅔	117½	55	—
'24 ...	111⅓	103½	70	106	211	—	23⅜	20¼	21½	152⅔	85⅓	—
'25 ...	106⅜	98⅝	84½	128½	206⅞	—	16¼	11⅚	12⅓	153[illegible]	98[illegible]	—
'26 ...	89	80½	98⅝	130	173	—	16[illegible]	11⅔	12⅝	154⅔	89[illegible]	—
'27 ...	86	79[illegible]	85	102¼	178	—	16[illegible]	12½	13[illegible]	143½	71½	—
'28 ..	92¼	87	77	101¾	185⅞	—	13½	10[illegible]	11½	143[illegible]	81[illegible]	—
'29 ...	89½	83	91	116[illegible]	180⅛	—	11[illegible]	8[illegible]	8⅞	141⅛	74[illegible]	—
'30 ..	92	86	89	105⅝	146[illegible]	—	8⅝	5[illegible]	6[illegible]	106[illegible]	42[illegible]	—
'31 ..	79	73	65	83⅜	130	—	7[illegible]	5[illegible]	6[illegible]	101¼	33[illegible]	—
'32 .	63	55	54	77	126⅜	—	7½	5[illegible]	5[illegible]	105[illegible]	54[illegible]	--
'33 ..	69	63	60	81½	105[illegible]	—	7[illegible]	4[illegible]	5¼	86[illegible]	42⅛	—
'34 ..	74	70	65	90[illegible]	79[illegible]	—	6[illegible]	4[illegible]	4[illegible]	87[illegible]	42[illegible]	—
'35 ..	75	70	62	89	92⅝	—	6[illegible]	3[illegible]	4¾	67[illegible]	29[illegible]	—
'36 ...	73	68	65	93[illegible]	98[illegible]	—	6[illegible]	3[illegible]	4¾	58½	30[illegible]	—
Average												
1904–13	58¼	51¾	47⅝	67	113	—	10⅛	10⅞	12	75½	43¼	—
1890–99	54⅓	41½	42¾	59	100	—	11½	11½	13¾	98	62	—
'78–87	64⅓	53	49	71	116	—	17	18	21½	78	52	—
'67–77	63	55	52	74	125	—	23	24	28½	87	64	—
	Index Numbers (or Percentages) of Prices, the Average of 1867–77 being 100											
1873 ...	113	114	104	109	98	760	101		98	*115	*134	125
1916 ...	148	157	169	148	153	1,067	100		93	90	78	84
'17 ...	182	199	212	200	173	1,345	121		115	109	91	100
'18 ..	174	199	248	247	198	1,447	127		125	148	110	129
'19 ..	181	207	246	258	202	1,493	155		153	167	180	174
'20 ...	230	263	324	324	241	1,844	263		262	170	174	172
'21 ..	208	228	234	242	200	1,527	81		77	140	98	119
'22 ...	199	221	194	196	162	1,286	62		54	140	116	128
'23 ..	182	196	171	154	149	1,135	104		87	135	86	111
'24 ...	177	188	135	143	169	1,103	93		75	175	133	154
'25 ..	169	180	162	174	165	1,133	60		43	176	154	165
'26 ..	141	146	190	176	138	1,050	60		44	178	139	159
'27 ...	136	145	163	138	142	967	62		47	165	112	139
'28 ...	146	158	148	137	149	996	51		40	165	127	146
'29 ...	142	151	175	157	144	1,021	42		31	162	117	140
'30 ...	146	155	171	143	117	992	31		22	123	66	95
'31 ...	125	133	125	113	104	836	29		23	120	53	87
'32 ...	100	100	104	104	101	737	27		20	121	85	103
'33 ...	110	114	115	110	84	740	25		18	100	66	83
'34 ...	117	127	125	122	64	757	22		16	100	67	84
'35 ...	119	127	119	120	74	749	21		17	78	46	62
'36 ..	116	124	125	127	79	763	21		17	67	48	58

* Index numbers not included in general average

† East India good middling from 1908

§ Raw Centrifugals, 96 per cent. Pol., from 1924.

‡ Comparative values.

|| White Javas C.I.F., from 1924

Average Prices of Commodities—Contd.

No. of Article.	19A*	19C*	19B[1]	19	16–19	1–19	20A	20B	21	22	—	23
	Tea.				Sugar, Coffee, and Tea.	Food.	Iron.			Copper.		Tin.
Year.	Congou, Common.	Indian, Good Medium.	Average Import Price.	Mean of 19A and 19B.	Total.	Total.	Scottish Pig.	Cleveland (Middlesbrough) Pig.	Bars, Common.	Standard.	English Tough Cake.	Straits.
	d. per lb.	*d.* per lb.	*d.* per lb.				*s.* and *d.* per ton.	*s.* and *d.* per ton.	£ per ton.	£ per ton.	£ per ton.	£ per ton
1873 ...	12	—	16·67	—	—	—	117·3	—	12½	84	92	132
1916 ...	8	10¾	11·29	—	—	—	90·0	84·0	13¼	115¾	134	182
'17 ...	16⅞	15¼	14·68†	—	—	—	95·7	89·7	13¾	124¾	136¼	238
'18 ...	20⅞	16	15·0	—	—	—	101·0	95·0	14	115½	126	331
'19 ...	13½	15	15·5	—	—	—	143·1	137·1	19⅕	92	99½	257
'20 ...	11¼‡	9⅗	14·97	—	—	—	214·11	208·11	28⅓	97⅕	112¾	302
'21 ...	4⅜	7	12·4	—	—	—	168·6	137·4	19⅛	69⅓	72⅗	171
'22 ...	8⅝	13⅔	14·9	—	—	—	99·10	90·7	11⅓	63⅓	66⅛	162
'23 ...	11	17 1/16	17·58	—	—	—	108·0	108·9	11⅞	65 9/16	69 15/16	206
'24 ...	9¼	17¾	19·0	—	—	—	96·8	88·2	12½	63 3/16	67 7/16	251
'25 ...	7⅞	14 15/16	18·34	—	—	—	83·4	72·8	11⅞	61 13/16	65½	267
'26 ...	7 13/16	16 15/16	18·82	—	—	—	87·2	87·6	11½	58 1/32	63 5/32	297 9/16
'27 ...	6¾	14⅜	18·58	—	—	—	80·5	73·0	11¼	55¾	60 9/16	303⅞
'28 ...	6 5/16	12¼	16·84	—	—	—	69·9	65·9	9 15/16	63¾	66 3/16	229 7/16
'29 ...	6 1/16	11 7/32	16·11	—	—	—	74·0	70·3	9¾	75 9/16	78 13/32	207 7/16
'30 ...	5 7/32	9¼	15·12	—	—	—	76·0	67·0	9 31/32	54¾	58 17/32	144 29/32
'31 ...	4 13/16	6 1/16	13·29	—	—	—	71·0	58·6	10 3/32	38⅛	39 5/16	121⅛
'32 ...	4 9/32	5 29/32	10·75	—	—	—	68·2	58·6	10	31 21/32	33 13/16	140
'33 ...	6 21/32	8 23/32	11·87	—	—	—	66	62·3	9 11/16	32 21/32	34 13/16	202½
'34 ...	8 21/32	12	13·20	—	—	—	69·6	66·11	9 17/32	30 7/32	32 23/32	232¼
'35 ...	6 23/32	10 11/32	13·06	—	—	—	70·6	67·10	9⅝	32 15/32	34 5/16	230 15/32
'36 ...	6¼	11⅝	13·19	—	—	—	78·6	73·2	10 3/16	37 15/32	41 29/32	207 21/32
Average 1904–13	7⅞	7⅛	8⅛	—	—	—	57¾	51⅕	6⅞	67¾	72	164⅞
1890–99	4⅝	7½	9¾	—	—	—	47	41½	5½	50	53	81
'78–87	6¾	—	12¾	—	—	—	46	38	5½	55	60	89
'67–77	11¼	—	17¼	—	—	—	69	60	8¼	75	81	105

Index Numbers (or Percentages) of Prices, the Average of 1867–77 being 100.

Year	19A*	19C*	19B[1]	19	16–19	1–19	20A	20B	21	22	—	23
1873 ...	107*	—	97*	102	426	2,037	170	—	152	112	—	126
1916 ...	71	—	65	68	345	2,476	135		166	154	—	173
'17 ...	150	—	85	117	453	3,211	144		166	166	—	227
'18 ...	186	—	87	137	518	3,307	152		170	154	—	315
'19 ...	120	—	90	105	587	3,515	217		234	123	—	245
'20 ...	100	—	88	94	791	4,447	329		343	130	—	288
21 ...	39	—	72	55	332	3,006	237		232	92	—	163
'22 ...	77	—	86	82	326	2,465	148		136	84	—	154
'23 ...	98	—	102	100	402	2,318	168		144	88	—	196
'24 ...	82	—	110	96	418	2,475	143		152	84	—	239
'25 ...	70	—	106	88	356	2,429	121		144	82	—	254
'26 ...	69	—	109	89	352	2,267	135		139	77	—	283
'27 ...	60	—	108	84	332	2,166	119		136	74	—	289
'28 ...	56	—	98	77	314	2,164	105		120	85	—	219
'29 ...	54	—	93	74	287	2,096	112		118	101	—	198
'30 ...	46	—	88	67	215	1,826	111		121	73	—	138
'31 ...	42	—	78	60	199	1,579	100		123	52	—	115
'32 ...	38	—	62	50	200	1,509	98		121	43	—	131
'33 ...	58	—	68	63	189	1,408	99		117	44	—	193
'34 ...	77	—	77	77	199	1,459	106		116	40	—	221
'35 ...	60	—	76	68	168	1,447	107		117	43	—	219
'36 ...	56	—	76	66	162	1,531	118		123	50	—	198

[1] Index numbers not included in the general average. † Approximate. ‡ Nominal.

Average Prices of Commodities—Contd.

No. of Article }	24	25A	25B	26	20–26	27	28	29A	29B	30A	30B	31
	Lead.	Coal.			Minerals.	Cotton.		Flax.		Hemp.		Jute.
Year.	English Pig. £ per ton.	Wallsend Hetton in London.§ *s.* per ton.	Newcastle Steam. *s.* per ton.	Average Export Price. *s.* per ton.	Total.	Middling American. *d.* per lb.	Fair Dhollerah.‖ *d.* per lb.	Petrograd.¶ £ per ton.	Russian Average Import Price. £ per ton.	Manila Fair Roping. £ per ton.	Petrograd Clean. (*a*) £ per ton.	Good Medium.†† £ per ton.
1873 ...	23½	32	—	20·90	—	9	6 3/16	47½	44	43	36	18
1916 ...	32½	27½*	41¼	24·64	—	9·00	7	76¾	85¼	54¾	71	31
'17 ...	32⅜	27½*	30	27·16	—	16·55	13⅝	113¼	151⅝†	84⅜	105½	39⅝
'18 ...	32⅜	33·6	33⅛	30·6	—	22·3	17⅛	120‡	156⅜	99⅜	166⅞	39¼
'19 ...	29⅜	45·3	45⅜	46·2	—	19·65	14¾	120‡	174⅜	58¾	147⅜	50⅛
'20 ...	40	32	51⅛	79·8	—	23·14	13⅔	120‡	345⅛	65⅗	145⅓	44⅛
'21 ...	24⅕	32¼	29	34·83	—	9·4	5 13/16	112½	118⅓	40¼	145‡	27⅝
'22 ...	25⅕	34⅖	24⅝	24·16	—	12·10	8	95	84⅞	33⅕	57‡	30¾
'23 ...	28 13/32	32 13/32	28	25·13	—	15·25	10	83⅜	84½	33¼	57	26
'24 ...	35 13/16	27½	22 3/32	23·38	—	16·26	11·03	120	104½	44	81	31¼
'25	37 7/16	29⅝	16 15/16	20·08	—	12·64	11·01	92⅕	120¾	46⅛	89¼	49 9/16
'26 ...	32⅛	**30 7/24	**16 5/24	18·59	—	9·40	7·75	65	72 15/16	43	74⅝	43⅞
'27 ...	25 9/16	23 1/16	14 13/16	17·80	—	9·54	8·27	95 13/16	74 1/12	43⅜	66 5/16	32¾
'28 ...	22 5/16	21 7/16	13 21/32	15·67	—	10·92	8·66	98½	91 15/16	37 11/16	63 13/32	33 15/16
'29 ...	24 1/32	23⅜	15 25/32	16·13	—	10·26	7·73	76 7/16	71 7/32	37 7/32	61	32
'30 ...	19½	24 23/32	14 7/32	16·64	—	7·49	5·12	53⅛	60 7/32	26½	48 7/32	20
'31 ...	14 9/32	24⅝	13¾	15·98	—	5·90	4·60	36	35 9/16	18¾	27½	15 15/16
'32 ...	13 5/16	23 13/32	13⅝	16·27	—	5·24	4·85	45 7/32	42 5/32	18 23/32	36	16 5/32
'33 ...	13¼	22⅝	13 25/32	16·08	—	5·54	4·53	51 13/32	48 13/32	15⅞	37	14⅞
'34 ...	12 13/32	20¼	14 1/32	16·08	—	6·70	4·80	60 11/16	50 29/32	14 29/32	42 5/16	14 5/32
'35 ...	16	20 9/32	14 13/32	16·30	—	6·71	5·42	79⅛	72 5/16	19 17/32	43¼	16 15/16
'36 ...	19 17/32	23 3/32	15 29/32	16·98	—	6·71	5·12	63 25/32	60 15/16	28 11/32	42 27/32	17 13/32
Average 1904–13	15⅝	18⅛	11⅞	11⅞	—	6½	5	32½	36⅞	30⅜	31⅜	18⅞
1890–99	12	17½	10⅜	10⅜	—	4¼	3	27	27	26½	25	12⅝
'78–87	14	16¾	8⅝	9	—	6	4¼	33	34	35½	26½	15
'67–77	20½	22	12½	12½	—	9	6¾	46	48	43	35	19

Index Numbers (or Percentages) of Prices, the Average of 1867–77 being 100.

Year.	24	25A	25B	26	20–26	27	28	29	30	31
1873 ...	117	145	—	167	989	100	92	97	101	95
1916 ...	159	125	—	197	1,109	100	104	172	161	163
'17 ...	158	125	—	217	1,203	183	201	282	243	207
'18 ...	158	153	—	245	1,347	248	253	294	341	207
'19 ...	143	206	—	370	1,538	218	219	313	264	264
'20 ...	195	145	—	638	2,068	257	203	495	270	236
'21 ...	118	147	—	279	1,268	104	86	246	237	145
'22 ...	123	156	—	193	994	134	118	191	116	162
'23 ...	139	147	—	201	1,083	169	148	179	116	137
'24 ...	175	125	—	187	1,105	181	163	239	160	167
'25 ...	183	135	—	161	1,080	140	163	227	174	261
'26 ...	157	138	—	149	1,078	104	115	147	151	231
'27 ...	125	105	—	142	990	106	123	181	141	172
'28 ...	109	97	—	125	860	121	128	203	130	178
'29 ...	117	106	—	129	881	114	114	157	126	168
'30 ...	95	113	—	133	784	83	76	121	96	105
'31 ...	71	112	—	127	700	66	68	76	58	84
'32 ...	65	106	—	130	694	58	72	93	70	85
'33 ...	65	103	—	129	750	62	67	106	68	78
'34 ...	61	92	—	129	765	74	71	119	73	74
'35 ...	78	92	—	130	786	74	80	161	80	89
'36 ...	95	105	—	136	825	74	76	133	91	93

---

* Approximate prices. † Approximate. ‡ Nominal. § Best Yorkshire house after 1916.
‖ Now No. 1 Oomra, Fine. ¶ Livonian Z.K. from 1921. ** Average price January–April, 1926.
†† Lightnings from 1931. (*a*) Russian Siretz Group 1, Sort 1 from 1931–33; Jugo-Slav Peasant from 1934.

Average Prices of Commodities—Contd.

32A	32B	33	34	27–34	35A	35B	35C	36A	36B	37
Wool.			Silk.		Hides.			Leather.		Tallow.
Merino, Port Phillip, Average Fleece.	Merino, Adelaide, Average Greasy.	English, Lincoln Half Hogs.	Tsatlee. †	Textiles. Total.	River Plate, Dry.	River Plate, Salted.	Average Import Price.	Dressing Hides.	Average Import Price.	Town.
.* per lb.	*d.* per lb.	*d.* per lb.	*s.* per lb.		*d.* per lb.	*d.* per lb.	*d.* per lb.	*d.* per lb.	*d.* per lb.	*s.* per cwt.
25	11¾	24½	21¾	—	11	8¼	—	18¼	—	44
32¾	16⅛	20	16¼	—	14¾	13¼	11·70	28½	27	46¾
46½	23¼	20⅞	21½	—	20	16	15·52	35	34⅛	62¼
47¼	23½	18¾	25¾	—	20⅛	13⅞	15·9	32¾	32¾	81⅞
67	32⅛	22⅝	26	—	22½	19⅜	17·1	36½	40⅝	87 15/16
79⅞	32	22	38⅜	—	20½	18¼	20·1	43⅜	71¼	75
31⅞	11⅝	8⅜	26 9/16	—	9 11/16	8⅞	9·58	25⅛	46¼	36¼
39	17⅛	9¾	28¾	—	9⅛	8⅞	8·06	24⅓	36	34⅝
43 11/16	20⅓	12	24¼	—	9 15/32	8 3/16	8·23	23 7/16	31 7/16	36⅜
53 7/16	25½	18⅞	23 7/16	—	10 3/64	8⅝	8·63	22 13/16	33⅞	42⅜
41 1/16	17⅜	17⅛	18⅛	—	11 7/16	8 13/16	9·87	23	33	42¼
36½	16 7/16	15	15 15/16	—	10 5/16	8	9·32	21⅛	35 11/16	38⅛
38 1/16	17 7/16	15 11/32	15 7/16	—	12 5/16	10 7/16	9·85	22 15/16	36 15/16	33⅞
37	17 5/16	17 23/32	14	—	15 7/16	11 29/32	12·09	23 13/16	37 7/16	36 11/16
35⅜	13 3/32	16 1/16	13⅞	—	10 9/16	8¼	10·80	19¼	38¼	36 13/32
18 9/32	8 13/32	10¾	10 15/16	—	6 25/32	6¼	7·80	18½	33½	28 23/32
14·7	7·1	8½	8 15/16	—	5½	5 9/16	6·12	17¾	32½	19⅛
15·0	7·2	5 25/32	8 5/32	—	4 9/16	4¾	5·47	17 3/32	28⅞	21 3/16
19·9	9·3	5 29/32	6¾	—	5¼	4 11/16	5·65	17 11/32	26 29/32	19 27/32
21¼	10·4	7	5 7/16	—	4 13/16	4⅞	5·71	17½	25 5/16	17¾
20·1	9·5	7 11/32	5 13/32	—	5 5/32	5⅛	5·51	17½	25 13/16	24⅝
24·7	12·2	10 5/16	5 25/32	—	6¼	6	6·47	17½	27 11/32	23 9/32
17⅜	9	10⅞	11¾	—	9⅝	7½	6⅞	16	17	31½
13½	6½	10	11½	—	6¼	5⅛	5	13¼	13¾	25
18½	8⅜	11¾	15	—	8⅝	6¾	6½	15	17	35½
21¼	9⅞	19¾	23	—	9	7	6⅞	16	18¾	45

Index Numbers (or Percentages) of Prices, the Average of 1867–77 being 100.

118	—	124	95	822	120	—	—	114	—	97
159		101	71	1,031	174			160		104
219		106	94	1,535	225			200		139
222		95	112	1,772	218			188		182
315		114	113	1,820	258			222		195
359		111	168	2,099	257			330		167
140		44	115	1,117	123			205		81
180		49	125	1,075	114			174		77
206		61	105	1,121	113			158		81
254		96	102	1,362	119			163		94
188		87	79	1,319	132			161		94
170		76	69	1,063	121			164		85
177		78	67	1,045	142			172		75
174		91	61	1,086	172			176		82
156		81	60	976	129			166		81
86		54	48	669	92			150		64
70		43	39	504	77			146		43
71		29	35	513	66			132		47
94		30	29	534	68			127		44
102		35	24	572	67			123		39
96		37	24	641	69			125		55
119		53	25	664	82			129		52

'ort Philip fleece washed nominal since 1895, exactly in proportion with the value of clean wool.
ommon New Style from 1921.

No. of Article	38	39	40A	40B	41	42	43	44	45A	45B	35—45	20—45	1—45
	Oil			Seeds	Petroleum	Soda	Nitrate of Soda	Indigo	Timber		Sundry Materials	Materials	Grand Total
Year.	Palm	Olive	Linseed	Linseed	Refined	Crystals		Bengal, Good Consuming	Hewn, Average Import Price	Sawn or Split, Average Import Price	Total	Total	
	£ per ton	£ per ton	£ per ton	s per qr	d per gall	s per ton	s per cwt	s per lb	s per load	s per load			
1873 ...	38	43	32	62	15¼	100	15½	6¾	65	62	—	—	—
1916 ...	44½	59¼	41¼	80¼	12	78½	17⅞	13⅜	82⅛	148½	—	—	—
'17 ...	46	115¾	56½	112¼	16⅛	89¾	25	10¼	97⅝	210	—	—	—
'18 ..	44⅞	198	63½	131⅛	21⅜	82¾	27¼	9	107⅜	271	—	—	—
'19 ..	69 7/16	200†	92¼	139¼	17⅜	118⅛	24⅞	9⅛	137½	232½	—	—	—
'20 ...	69¾	200†	88	157	25⅜	150⅞	24¾	14½	119	261⅞	—	—	—
'21 ...	36⅞	80†	31	72	22 1/16	140	18 15/16	11 7/16	68¾	156¼	—	—	—
'22 ..	34¾	75½†	39½	75½	15¼	123	14¼	9¼	46⅝	117½	—	—	—
'23 ..	36¼	66 9/16	42 1/16	77⅝	13	103	13 7/16	7½	48	131⅛	—	—	—
'24 ..	40 3/16	79 15/16	42⅝	81 3/16	13⅛	101¾	13⅝	6 1/16	49	122	—	—	—
'25 ...	40⅝	73⅜	43¼	80	13⅛	100	13⅜	5¾	47¼	122¼	—	—	—
'26 ...	37⅝	79	32⅛	63 7/16	13	100	13¼	5⅝	48	107	—	—	—
'27 ..	34¼	102⅝	31¾	64	13	100	12	5½	45	107	—	—	—
'28 ..	35¾	80	29⅞	66¼	11	100	10	5½	45⅞	111	—	—	—
'29 ..	34	72	35	74⅛	12¾	100	10¼	5½	44¾	107	—	—	—
'30 ...	25¼	52⅛	36⅜	61	12¾	100	9	5½	44	102	—	—	—
'31 ...	19	53	18	38⅞	11¼	100	9⅛	5½	37	83⅜	—	—	—
'32 ...	17	57	17	38	10½	100	8	5½	35½	75	—	—	—
'33 ...	15	53	20¾	39¾	10¼	100	8	5½	31⅞	75	—	—	—
'34 ..	13	62	21	42⅜	10	100	7	5½	31½	79	—	—	—
'35 ...	19⅛	61	24	43¼	10½	100	7⅝	5½	32¼	73	—	—	—
'36 ...	19	70	28½	48	10	100	7⅝	5¾	22	78	—	—	—
Average 1904–13	31¼	43¾	26⅝	49½	6⅞	60	10⅝	3	38	56	—	—	—
1890–99	24½	35	19¼	38	5⅛	53	8¼	4⅜	40	45	—	—	—
'78–87	32½	40	23	46	6⅞	62	12½	6	47	47	—	—	—
'67–77	39	50	30	60	12½*	92	14	7¼	60	54	—	—	—

Index Numbers (or Percentages) of Prices, the Average of 1867–77 being 100

Year	38	39	40A	40B	41	42	43	44	45A	45B	35—45	20—45	1—45
1873 ...	97	86	105		122*	109	110	92	111		1,163	2,974	5,011
1916 ...	114	119	135		96	86	128	183	202		1,501	3,641	6,117
'17 ...	118	231	167		129	98	178	142	270		1,917	4,655	7,866
'18 ...	115	396	216		170	90	194	124	332		2,225	5,344	8,651
'19 ...	178	400	258		138	128	177	126	325		2,405	5,763	9,278
'20 ...	179	400	272		203	164	177	200	335		2,684	6,851	11,298
'21 ...	95	160	116		177	152	135	158	198		1,600	3,985	6,991
'22 ...	89	151	127		122	134	102	128	143		1,361	3,430	5,895
'23 ...	93	133	134		104	112	96	103	157		1,284	3,488	5,806
'24 ...	103	160	138		105	111	97	84	151		1,325	3,792	6,267
'25 ...	104	147	137		105	109	96	79	150		1,314	3,713	6,142
'26 ...	96	159	106		104	109	95	78	137		1,254	3,395	5,662
'27 ...	88	205	107		104	109	90	76	134		1,302	3,337	5,503
'28 ..	92	161	108		94	109	78	76	138		1,286	3,232	5,396
'29 ...	89	144	122		102	109	73	76	134		1,225	3,082	5,178
'30 ...	65	104	110		102	109	70	76	129		1,071	2,524	4,350
'31 ...	51	108	63		90	109	65	76	106		934	2,138	3,717
'32 ...	45	114	61		84	109	62	76	97		893	2,100	3,609
'33 ...	40	108	67		82	109	60	76	94		875	2,159	3,567
'34 ...	35	124	71		80	109	56	76	97		877	2,214	3,673
'35 ...	50	123	75		84	109	54	76	92		912	2,339	3,786
'36 ..	51	140	85		81	109	54	79	89		951	2,440	3,971

* Petroleum average, 1873–77

† Nominal.

MISCELLANEA.

CONTENTS.

PAGE
Changes in the Value of the Agricultural Output of England and Wales. By R. J. Thompson, C.B. 291
Note Suggested by Review of "100 per cent Money". By Irving Fisher. 296

CHANGES IN THE VALUE OF THE AGRICULTURAL OUTPUT OF ENGLAND AND WALES.

By R. J. Thompson, C.B.

Although so much has been written and said about the agricultural depression in this country, the statistical means of forming any opinion on the subject are very limited. One series of figures which is frequently used is the index number of the prices of agricultural produce, but this, though useful, deals with only one factor among the many which need to be taken into consideration. A wider, though still only partial, view of the position is to be obtained by examining the changes in the value of the agricultural output as estimated annually by the Ministry of Agriculture. This estimate, which is available since 1925, gives an idea how the gross receipts of the industry have varied from year to year under the joint influence of changes in price and changes in production, and thus carries the problem one stage further than the index number of agricultural prices: in broad outline it shows how the depression has affected agriculture (taken as a whole) on the *revenue* side of its balance sheet. To make the picture complete, one would need to know the corresponding cost of production, but in regard to this very little information is available. So far as it goes, however, the information as to the fluctuations in the gross agricultural revenue throws a not uninteresting light on the difficulties the farming industry had to meet in the period 1930–35 as compared with the preceding five years.

In this estimate of output,* the agricultural land of England and Wales is treated as if it were one huge farm, and account is taken only of produce sold off the land to the non-farming community (including home produce used in farm households). Much of the produce grown by farmers is merely raw material for the manufacture of meat and milk, and consequently does not need to be valued separately, as it is all represented in the value of the final product. In the same way, sales from one farmer to another do not have to be taken into account, as the value of the product when it is finally sold to a miller or dealer on its way to the consumer covers all the preliminary and intermediate operations involved. The basis of valuation is the average price realized at the point where the produce is first sold, based on market prices collected weekly.[*]

---

* Particulars of the method adopted are given in *The Agricultural Output of England and Wales, 1930–31*; the figures for the respective years are given in the *Annual Agricultural Statistics*, Part I.

The table below shows the value of the output estimated in this way in the eleven years 1924–25 to 1934–35, these being the only years for which continuous figures are available; all agricultural produce is included, together with fruit and vegetables, but flowers, nursery stock and glasshouse produce are excluded as the value of these three items is not estimated annually. In 1930–31, they were considered to be worth £7,120,000. In the three most recent years payments were made to farmers under the Wheat Act and the Cattle Industry Act, and as these are equivalent to an increase in the realized price, they are included, but are shown separately.

Estimated Value of the Ouput of Agricultural and Horticultural Produce in England and Wales.

Year	Value (£ thousands).	Percentage of Average of 1924–25 to 1926–27.	Agricultural Index No. Average of 1924–5 to 1926–7 = 100
1924–25	228,330	105	105
1925–26	217,630	100	100
1926–27	206,440	95	95
1927–28	213,940	98	95
1928–29	214,870	99	93
1929–30	209,580	96	90
1930–31	195,540	90	81
1931–32	182,590	84	74
1932–33	177,710	82	69
	182,220*	84*	71*
1933–34	194,630	89	73
	201,810*	93*	76*
1934–35	201,630	93	75
	209,930*	96*	79*

* Including the Wheat and Cattle Subsidies.

As an aid to comparison, the annual figures are shown as percentages of the average of the first three years 1924–25 to 1926–27, a period including one very high year and one very low year, the latter due partly to a drop in prices and partly to an unfavourable season. This three-year average (£217,466,000) does not differ materially from the average of the first five years (£216,242,000), and so may be regarded as fairly representative. In taking it as a standard of comparison, however, it is important to note that these years were not considered at the time as a period of any particular prosperity, though it is, I think, the view of impartial observers that the relative stability of prices in the five years 1925–29 did conduce to a condition which was not too unfavourable. After these five years, a distinct decline set in, and in 1932–33 the value of the output was 18 per cent. below the three-year average; the two subsequent years showed a recovery, and the total for 1934–35 (including the subsidies) was very slightly higher than the total for 1929–30.

---

[*] Mr. Carslaw in a paper read before this Society in May, 1935 (Vol. XCVIII, Part IV), says that these prices do not represent "farm prices," as "they generally cover transport to market and salesmen's commission, and are therefore higher than the net price received by the farmer." This is quite true, but if it is necessary to incur these charges in order to sell the product they must, I think, be regarded as part of the necessary costs of production and be put in the same category as other costs.

It is evident from these figures that farming went through a very bad period from 1930–31 to 1933–34. It has been said with great truth that what agriculture needs is not high prices, but stable prices. These years are an example of the disastrous effect produced by continuously falling prices. If we take the figure of £216 millions (the average of the first five years shown above) as being the sum which, under the conditions then prevailing, was required to secure to agriculture a very moderate degree of prosperity, the falling off in the succeeding six years amounted in the aggregate to no less than £135 millions, though the effect of the Wheat and Cattle Subsidies was to reduce this sum to £115 millions. This decrease in revenue was probably partly counterbalanced by some savings in the cost of production, but the magnitude of the gross decrease and particularly the progressively larger amount of the decline each year from 1929–30 to 1932–33 fully explains the consternation felt by farmers at the slump which was taking place.

Moreover, this decrease was occurring in the face of an increased production. Farmers were producing more in actual volume, and receiving substantially less in terms of money. This becomes apparent if the production for a series of years is valued at a fixed price. This calculation has been made by the Ministry of Agriculture and shows that the *volume* of the output in 1930–31 was about 4 per cent. greater than it was in 1924–25, although the *value* was less by 14 per cent., viz. £228 millions in 1924–25 and £195 millions in 1930–31. After 1930–31, the volume of production increased more rapidly: in 1932–33 it was greater by 9 per cent., in 1933–34 by 15 per cent., and in 1934–35 by 20 per cent. than it was in 1930–31. In the year 1932–33, when the value of the gross output reached the minimum and was 22 per cent. below the year 1924–25, the *volume* was actually 13 per cent. greater.

The increase in production has not been uniformly spread over the different products and has not operated in exactly the same way throughout the period. If the total is divided into three main groups of products, there seems evidence of a fairly continuous increase in the output of livestock and livestock products (chiefly dairy produce, poultry and eggs), while farm crops, and fruit and vegetables, which are more subject to weather conditions, have fluctuated, and showed an appreciable increase only in the last two years. Broadly speaking, the increase in production (apart from what is due to seasonal fluctuations) probably represents a transfer of activities from less profitable to more profitable openings. Farmers, faced with a serious decline in prices—more serious in the case of some products than others—would naturally seek to increase the output of such produce as seemed to promise better results, and would endeavour as far as possible to adapt their systems to the altered conditions. The Government policy of assistance to agriculture by restoring confidence must also have had a great influence in stimulating production.

Although this greater volume of production was very far from being sufficient to maintain the gross revenue in face of the slump in prices, it did in fact have a material influence in that direction. Comparing the output expressed as a percentage (in effect a price-production index number) with the index number of prices as shown in the table, it will be seen that prices alone fell much lower and recovered much more slowly. It has, however, to be borne in mind that the official index number of agricultural prices is now somewhat out of date, as it has as its base the pre-war years 1911–13; an index number of the range of prices in these eleven years weighted in accordance with modern conditions would probably show a somewhat smaller decline. Another factor is that in the output estimate all commodities are valued separately, whereas in the price index some of the less important items (including sugar beet) are not included.

Taking the figures as they stand: in 1932–33, the minimum year, the price index was 31 per cent. below the average (1925–27), whereas the decline in the total value of the output was only 18 per cent.; in 1934–35 the price index was still 25 per cent. down, against only 7 per cent. in the output. With the addition of the Wheat and Cattle Subsidies, the output value was only 4 per cent. below the average.

From these estimates of the value of the output, it seems clear that the agricultural industry, taken as a unit and viewed in this broad and general sense, has succeeded by an augmentation of production in evading to some extent the full force of the decline in prices. Its position, therefore, during the years of depression has been somewhat less unfavourable than is suggested if one looks at the fall in prices alone.

Whether this enlargement of production was effected without any corresponding increase in cost is uncertain, but may quite well have been the case. Purchased materials, such as feeding stuffs, fertilisers, etc., constitute one of the main items in the cost of production, and the prices of these fell in much the same way as the prices of agricultural produce, so that larger quantities could have been used without necessarily incurring additional expense.

NOTE SUGGESTED BY REVIEW OF "100 PER CENT MONEY"

By IRVING FISHER.

THE readers of the *Journal* may be interested in the following note *à propos* of the review of my book 100 *per cent Money* (Vol. XCIX, Part II, 1936, pp. 388–390). I write this note not mainly as the author of the book, but rather as one who thinks that the 100 per cent reserve principle offers a chief means of preventing great crises, and therefore ought to be more thoroughly understood by readers of your *Journal*.

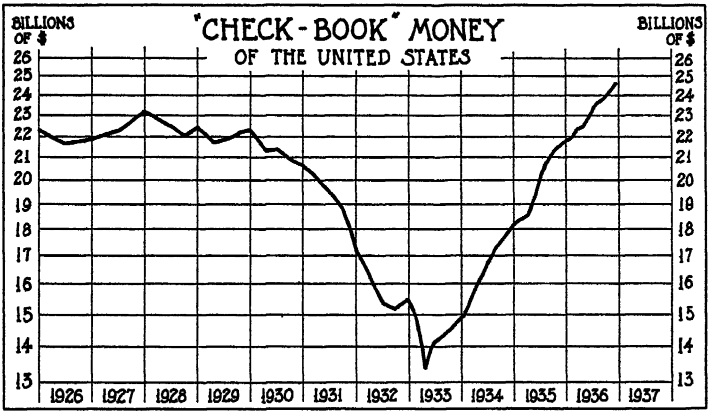
The reviewer says, " The primary purpose is to safeguard the depositors, and so to guard against panics." This is a mistake, though a very common one. It is true, of course, that, if a bank holds a 100 per cent. reserve against its demand deposits, used as checking accounts, the depositors are fully safeguarded, that panics could not occur; but safeguarding depositors is of secondary importance. If that were all, the 100 per cent. plan would scarcely be worth writing about, especially as to-day deposits are safeguarded in other ways. In the United States they are safeguarded by deposit insurance. In Great Britain safeguarding the depositor has, in this generation, scarcely been a problem; therefore if this were the primary purpose of the 100 per cent. plan, it could scarcely have any interest for Englishmen.

It may be that, in the book, I did not sufficiently emphasise the distinction which I am now making, though I did try. For instance, I said (2nd edition, p. 14) referring to eight advantages of the plan, " Advantages '6' and '7' are by far the most important, *i.e.* the cessation of inflation and deflation of our circulating medium, and so the mitigation of booms and depressions."

Against such fluctuations neither the American system of deposit insurance nor the British system of branch banking furnishes much protection, even granted that they fully safeguard the depositor against loss of his deposit and safeguard the bank against runs or panic.

Under the present system—that of partial reserves—if a depositor withdraws cash, he tends to stimulate the bank to reduce deposits by a much larger amount, say tenfold; and, reversely, when a depositor deposits actual cash, he tends to stimulate the bank to expand deposits many times as much. Even without such withdrawals or deposits of cash, the total volume of deposits is subject to great fluctuations owing to the fluctuations in loans and investments. When, as in 1929, the public was borrowing freely of the banks, the loans engendered corresponding deposits, and so increased the circulating medium. When, on the other hand, in 1930, 1931, 1932, bank loans were being liquidated, demand deposits were being destroyed thereby and the circulating medium was decreased. In the United States, for instance, the volume of demand deposits, or " cheque-book money," as I prefer to call it (for contrast with " pocket-book money ") shrank by 8 billion dollars between 1929 and 1933, owing to both the above processes, the withdrawal of cash and the liquidation of bank loans.

Had the banks possessed 100 per cent. reserves of " pocket-book money " to cover the " cheque-book money " or demand deposits, neither of the two processes above described could have reduced the nation's volume of circulating medium by a single dollar. The depositors could even have withdrawn all their 22 billions. They would still have these 22 billions. These would simply have been in their pocket-books in tangible money, instead of in their cheque-books as balances against which to draw cheques. Or if they had withdrawn only 1 billion, as in actual fact they did, they would, under a 100 per cent. reserve system, simply have increased the money in their pockets by that 1 billion and decreased their " money " in bank by that same billion (instead of by the many billions which actually resulted). Again, had we had a 100 per cent. system, the liquidation of bank loans could not have destroyed any of our circulating medium.



In short, under our present system, a bank, when it extends credit in consideration of a promissory note of a customer, issues or creates circulating medium just as if it had issued so much newly printed bank notes, and, when it extinguishes such credit in payment of a promissory note, it destroys that much circulating medium, just as if it had burned up so much of its bank notes returned to it.

According to the best available estimates, the actual behaviour of American "cheque-book money" was as indicated by the chart. Had the 100 per cent. system been in force, the curve would not have had the "*V*" cut out of it. In fact, it could have been conformed to any criterion of smoothness. That is, the "*V*" was not necessary. But, once having happened, it necessitated the great depression, and not only in the United States, but also in England and in all other countries having the same monetary standard.

The 100 per cent. plan would do for deposits, or cheque-book money, exactly what the Bank Act of 1844 did for Bank of England notes, pocket-book money. Beyond a certain point every bank note must be covered £ for £, or 100 per cent., by official money. If I am not mistaken, Sir Robert Peel and Lord Overstone offered substantially the same arguments for the 100 per cent. idea as are offered now. These arguments are much stronger to-day, as applied to deposits, than they were a century ago, as applied to bank notes, for the very good reason that bank deposits differ more widely from the reserves in which they are redeemable than bank notes differ from the reserves in which they are redeemable. Had Sir Robert Peel foreseen the evasion of his 100 per cent. principle, in the advent of deposits masquerading as real money, he would, presumably, have insisted that the 100 per cent. principle should be applied to all forms of circulating bank liabilities instead of to only one. In that case there could not have been such fluctuations in the volume of circulating medium as have been experienced on both sides of the Atlantic in recent years, nor any such depression.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

CONTENTS.

PAGE
1.—*Levy* (*H.*) and *Roth* (*L.*). Elements of Probability ... 299
2.—*Stamp* (*Sir Josiah*). Fundamental Principles of Taxation in the Light of Modern Developments 300
3.—*Thomas* (*Brinley*). Monetary Policy and Crises 301
4.—*Meade* (*J. E.*). Introduction to Economic Analysis and Policy 302
5.—*Pigou* (*A. C.*). Economics of Stationary States 303
6.—*Knight* (*A. W.*). Abolish Slumps, a Diagnosis of the Trade Cycle 306
7.—*Clare* (*George*) and *Crump* (*Norman*). A B C of the Foreign Exchanges 307
8.—*Angas* (*L. L. B.*). Investment for Appreciation ... 307
PAGE
9.—*Kuczynski* (*Jürgen*). Labour Conditions in Western Europe 309
10.—International Institute of Agriculture. World Agricultural Situation in 1934–35 ... 310
11.—*Smith* (*W. Millar*). Marketing of Australian and New Zealand Primary Products ... 312
12.—*Stewart* (*W. D.*). Mines, Machines and Men 313
13.—*Riley* (*G. S.*). Building Society Practice 314
14.—*Wickwar* (*W. Hardy*). The Social Services: a Historical Survey 315
15.—*Say* (*J. B.*). Letters to Malthus 315
16.—Paradoxes Inédits du Seigneur de Malestroit touchant les Monnoyes 317
17.—Other New Publications ... 319

1.—*Elements of Probability.* By H. Levy and L. Roth. Oxford: Clarendon Press (Humphrey Milford: Oxford University Press), 1936. 9″ × 5¾″. x + 200 pp. 15*s.*

The authors, two members of the mathematics staff of the Imperial College of Science and Technology, have, in this book, treated the subject of the title in a somewhat original way. Both in content and in method the traditional subject has been modified, and though not everyone will agree with the writers in their especial emphasis, yet the fact that they have been able to make no special references to other text-books save to Whitworth's *Choice and Chance*, and in passing for particular points to *e.g.* Fisher's *Statistical Methods*, Jeffrey's *Scientific Inference*, indicates the freshness of their view.

The book opens with a historical introduction, from classical Greek insurance to modern statistical mechanics, and continues by dealing in a very useful and clear fashion with the various definitions of probability and their logical implications. This leads to an elementary portion on standard mathematical probability, though here again modernized by a section dealing, *e.g.*, with Tchebycheff's Problem, to be followed by chapters relating to some more advanced and recent work (*e.g.*, Hennite's polynomials, maximum likelihood, the "telephone problem"). Some of this is, as far as we are aware, original and not to be found elsewhere in the literature. These chapters are not exhaustive, and a reference to some of the other modern writers would have been useful to the private student. The book closes with a table of the error function (to five decimal places) for $x = 0{\cdot}00$, — 0·02, 3·00. Altogether the book can be cordially recommended as giving an original and stimulating survey of some of the aspects of the problem of probability to-day. The criticisms that we have to make refer to comparatively unimportant matters of detail.

The chapters are, as a rule, followed by sets of examples. The private student will not always find solutions or answers to these. This is especially unfortunate, for in some cases matters of theoretical importance are concerned, and in others there is some slight obscurity of phrasing. As an example of the first may be instanced the question of the various solutions of geometrical probability depending on assumptions of point-density. This is tucked away in the last line of a question (p. 77, Ex. 1) as "Note the difference between the two results: to what is it due?" As an example of the second we turn to p. 93. Th. IV, Ex. 1, is, it is submitted, incompletely stated, but the solution makes the assumption clear: Th. V, Ex. 1, is also incomplete, but in the absence of any solution it may present difficulties to the student. In dealing with frequency distributions of arrays the boundary of the array is not clearly defined (where do the writers put a leaf of width measured exactly as 1·1″ in p. 102?) and fractional frequency (p. 105) is not explained. Further on in this chapter is a statement that a probability curve is not necessarily continuous (p. 119), when we have been told (p. 104) to get a probability curve by drawing a continuous curve through points A, B, C, . . . The opening portion of Chapter IX, which contains a large amount of original matter, does not make it quite clear whether t can be measured by discrete units only—p. 146 speaks of readings *over* a time $t \pm t'$, p. 147 of readings *at* $t + s$. In one or two other cases slight verbal emendations would be desirable, whilst there is apparently a misprint on p. 75: one of the two $\sqrt{2}$ should read something else, whilst for the review copy the type has not been sufficiently level, for an apparent vinculum has been printed in l. 6, p. 116. The get-up of the book is admirable, and writers and publishers alike are to be congratulated on a very useful addition to one's library on probability. F. S.

2.—*The Fundamental Principles of Taxation in the Light of Modern Developments.* New and Revised Edition. By Sir Josiah Stamp, G.C.B., G.B.E. London: Macmillan, 1936. 9¼″ × 6¼″. viii + 220 pp. 10*s.* 6*d.*

This well-known work embodies the Newmarch lectures for 1919, practically in the form in which they were delivered. The author has few equals in treating an economic subject in a popular manner, and the issue of this new and revised edition is sufficient testimony to his successful treatment of what is never likely to be a very popular subject. Although he disavowed any intention of making a complete appraisal of each tax, and did not attempt to make a detailed study of the fundamental principles of taxation, he set out the main outlines in a clear and refreshing manner, drawing on his long practical experience to explain the new problems and to show some of the old in a new light or with a different emphasis. The new edition has been somewhat enlarged with illustrations of the more recent tax problems and experiments, but the main body of the work remains unchanged, and for the volume as a whole there can be little but praise.

One wishes, however, that in this revised edition the opportunity had been taken to amend the treatment of the psychological justification of progressive taxation. Hasty readers of pages 42, 48 to 50, and 53 may be misled into believing that once they accept the dubious assumption of a universally applicable scale of income utility, then the law of diminishing utility inevitably entails progressive taxation if equality of sacrifice is to be secured. But surely, even when coupled with such an assumption, diminishing marginal utility of income does not necessarily prescribe progression, and (according to the assumed shape of the representative taxpayer's income-utility curve) conceivably might entail proportionate or even regressive taxation —or a combination of all three. In fact, the table of diminishing income utility (p. 49, column three), which Sir Josiah uses as an illustration, seems to indicate a state of affairs where, if equality of sacrifice is to be secured, taxation should be not progressive, but regressive.

His figures assume a deduction of a constant fraction from each foregoing stage, the utility of the 2000th £, for example, having one-tenth less utility than the 1000th £, the 3000th £ one-tenth less than the 2000th £, and so on. Then, Sir Josiah says, if taxation " took away x from the 3000th £, it would have to take away $\frac{13{\cdot}122}{6{\cdot}974}x$ at the 9000th £ (or nearly $2x$) to deprive the owner of the same 'utility,' and that equality of deprivation is the rationale of progressive taxation " (p. 50). But the burden is borne not by pounds, but by persons. And if we assume that the man with £9000 a year pays on three times as many pounds, at least, as the man with £3000, then (if average utility per £ extorted is in the one case one-half that in the other) " equality of deprivation " would seem to prescribe not progressive, but regressive taxation. The decisive factor is not whether, in the case of the representative taxpayer, marginal utility of income falls, but the rate at which it falls. C. O. G.

3.—*Monetary Policy and Crises, a Study of Swedish Experience.* By Brinley Thomas, M.A., Ph.D. London: Routledge, 1936. $7\frac{1}{4}'' \times 5\frac{1}{4}''$. xxii + 247 pp. *7s. 6d.*

The material presented by Dr. Thomas as the outcome of a half-year's study of Swedish life and institutions is full of interest, even when it leads one to wonder how far the charm of his guides may have affected, in some degree, his economic judgment. There is not, indeed, room in this modest volume for more than a rapid survey, and a sensation of breathlessness, in its eagerness to tell as full a story as possible, can hardly be avoided. No attempt will be made here to deal with the sketch of the contributions to monetary theory made by Swedish writers, which takes up a large part of the earlier chapters. We shall turn to the concluding third of the book, which handles the post-war experience of Sweden, and discusses movements in production, trade, prices and wages. Here the striking wealth of statistical data assembled by the Unemployment Commission has given the author an almost embarrassing choice, while limited space has prevented any full criticism. Readers would do well to reflect on the position described.

To illustrate, let us consider the significance of the table setting out, on p. 174, the direction of foreign trade in 1920, 1927 and 1929 compared with 1913. From 1920 to 1929 the proportion shown as sent to the British Isles decreased, while sales to Germany and the U.S.A. increased, so as to leave the aggregate share of the three countries unchanged. The financial position in 1920 may well account for much or all of this change, the fact being borne in mind that the countries shown are those with which the money payments —not the exchange of the actual goods—were carried through.

Immediately preceding this it is mentioned that industries the products of which were exported in larger proportion in 1928 than in 1913 (this seeming to be the meaning of expansion in 1913–28) employed 45 per cent. of the industrial population. To what date or period that percentage applies is not clear. Nor is it clear whether, in aggregating these industries, volume or value of goods made or exported is the basis used. If the latter, the world market demand for Swedish products (extended as a result of territorial changes made in the Treaties of Peace) may have been expanded by favourable prices, and the industries concerned may have drawn to themselves, from other employment, the labour needed to supply the needed goods to those markets. But it does not appear to be alleged that the foreign market provided employment for 45 per cent. of the industrial workers, and the figures do not, in themselves, prove great sensitiveness of the Swedish market to changes in the outside world.

The use of 1915 as a base year from which to reckon post-war outputs, wages per man-hour, etc., is not entirely convincing, in the absence of some evidence that that year was not seriously affected by the early incidents of the War. Dr. Thomas doubtless assumed that his Swedish friends had taken this into account, but his readers may not be able to make that assumption as one inherently probable.

These are just a couple of illustrations of the absence of conviction that the sequence of events, and their inter-relations, were precisely those suggested in the descriptions given by Dr. Thomas, that afflicts at least one reader with a critical disposition. That it may be due to excessive concentration may explain it, but it does not remove it completely. A. W. F.

4.—*An Introduction to Economic Analysis and Policy.* By J. E. Meade, Fellow of Hertford College. Oxford: Clarendon Press, 1936. $7\frac{3}{4}'' \times 5''$. xv + 392 pp. 10*s.*

"The old order changeth, yielding place to new." Mr. Meade has essayed an exposition of "modern" ideas in economics. For Adam Smith, Malthus, Ricardo, Mill, Jevons, and Marshall we now find Keynes, Pigou, Mrs. Robinson, Harrod, and many others skilled in modern analytic methods. It would be a useful exercise to re-examine, though in a less polemical manner than that adopted in the same pursuit by the late Professor Cannan, the theories of the classical economists and show how far they were related to what was known and understood of the economic facts of the time in which each successive development took place. One might then try to establish the relations between the ideas of the moderns and the economic situation of the present day, for the sufficiency of those relations would be the true test of the efficacy of those ideas. Mr. Meade has not exactly done this, but he has done something very useful. " Many of these new ideas," he says in his preface, " are not yet available to any but the trained economic theorist; for new scientific work must always at first be stated in technical terms." So he first devotes himself to an exposition of the new theories, and, borrowing from many authors, he has built his conveyings into a coherent body of doctrine. Further, as a teacher he has found that his pupils " cannot see that the formal analysis of the text-book has anything to do with the real world," and so he has " attempted to supplement that training by combining it with the direct discussion of economic problems. This method has made it necessary to advocate a particular economic policy." This method of dealing with economics is far superior to that of the other school which disclaims all responsibility for welfare and arrogantly says, " Tell me what you propose to do and I will tell you the consequences." Practically, that generally means " Go and see what the Government are doing and tell them not to ! " We must praise Mr. Meade for having taken his courage in his hands and put his ideas to the test of their applicability to practical problems.

The confirmed sceptic may reflect that there may be several lines of argument by which particular solutions of problems of political economy—here the old phrase is distinctly appropriate—may be defended and that agreement on a solution need not imply agreement on anything else. He may also be disposed to question some of the assumptions of the theorist; he may be inclined to doubt, for example, whether it is really true that " a producer with a given plant and equipment can produce more by employing more men with it," whether, in fact, the several products of the " factors of production " can be separated from one another. But he will make a grave mistake if he thinks he can afford to neglect Mr. Meade's book, for even if he remains a sceptic he will find the justification of his doubts a useful intellectual exercise. The exposition is patient and lucid, the application is clear and practical. Mr. Meade describes his book as " a transcription of the work of many authors," but that is far too modest a claim. It is no mean achievement to weave a garment out of many strands.

H. W. M.

5.—*The Economics of Stationary States.* By Professor A. C. Pigou. London: Macmillan, 1935. $8\frac{1}{2}'' \times 5\frac{3}{4}''$. xi + 326 pp. *12s. 6d.*

Professor Pigou calls his book " an essay in positive economics," the task of which is, he says, to display the structure and working of the economic cosmos as an outgrowth of the principle of maximizing satisfaction (p. 4). By way of simplifying this task, "economists have devised and made use of the fiction of a stationary state." This is a more convenient assumption than one of steady growth, in that it excludes processes of transition altogether, and concentrates on conditions of true equilibrium. This equilibrium is "the state of things that tends to be established." Tendencies which never last long enough unchanged to reach the conditions of equilibrium to which they point are an elusive and unsatisfactory subject-matter. The stationary state offers a complete account of the equilibrium conditions and so provides a method of formulating the tendencies.

The conception of a stationary state is not new. It has been latent in the theories of generations of economists. Nevertheless Professor Pigou's systematic account of it is highly original. He has done something which has never been attempted before, and he has brought to it in full measure the thoroughness and acuteness which have long distinguished his work.

A stationary state might be one in which there is on the whole no progress or regress, but some industries increase and others decrease, or it might be one in which each separate industry as a whole remains constant but its constituent productive concerns may increase or decrease subject to that condition, or it might be a state in which not only every industry but each constituent productive concern remains unvarying. It is the third type of stationary state that Professor Pigou takes as his subject.

He applies his unsurpassed analytical powers to building up his hypothesis step by step. First he studies a Crusoe Economy containing one person and many commodities; then an economy in which there are many persons and many commodities, but each person makes what he has to sell independently and does not co-operate with other people or with non-human factors of production; next he turns to a model system in which many different sorts of people and of non-human factors co-operate, but produce only a single sort of commodity. Finally this model is modified by bringing into account the existence of many different sorts of commodities.

The stationary state is a favourable field for mathematical economics, and Professor Pigou has applied mathematical methods to many of his problems. But he has wisely relegated this portion of his work to Appendices (extending over more than 60 pages) and has set out the main part of his exposition in language with very little intrusion of algebraical symbols.

The result is a work of high educational value. The method of abstraction employed, however, is by no means always a simplification. Sometimes the abstraction involves a greater intellectual effort than the handling of the complexities of a closer approach to reality. The condition of a truly stationary state involves the grafting of some rather far-fetched assumptions on human nature. Saving must be zero. Not merely the numbers but the age-distribution of the population must be unvarying. And any tendency towards change, however slow, must be assumed to have exhausted itself.

Professor Pigou sometimes deals with the behaviour of factors of production in general, as if his reasoning were equally applicable whether there were three factors or thirty. Such an effort of abstraction is far from being a simplification. He endeavours to show that there need not be any essential difference in the measurement or methods of remuneration attributed to the several factors (pp. 116–7). The idea is original and suggestive, but hardly tenable. To express the price of labour as a percentage of "the cost of production of a workman of given skill" would surely be to throw to the winds any hope of a rational treatment of the causes determining price. In any case, the production of a human being, whatever it costs, is not simply the production of a "workman." His earning power is no more than a by-product of his existence, and even though some of the cost of his upbringing may have been directed expressly to developing this side of him, no exact allocation is likely to be possible.

Again, the idea that land, the factor of production that is the source of economic rent, is susceptible of measurement in quantitative units such as "acres" is a misconception. "Obviously," we are told, "the proportion of land as compared with labour will be larger in wheat-growing than in lace-making." It is not obvious at all. The wheat-growing may be on marginal land yielding no rent, and the lace-making may be on an expensive urban site. The "factor" consists in the differential advantages of position or natural resources, advantages which cannot be expressed in terms of superficial area or in any unit except value.

Much of Professor Pigou's reasoning is concerned with the size of the productive units, to which he gives the not very happily chosen name of centres of production. The reader has to discover from the context that the term "centre" means the same as "firm" in Chapter II, and has no local significance.

It is argued that as a characteristic of the stationary state the productive units in any industry will be as near as possible to "optimum" size. Optimum size is reached when (the relative proportions of the several factors being supposed given) the marginal product of an additional factor group unit is equal to the average product of the factor group units employed. If the marginal product exceeds the average product, the latter can be increased by increasing the size of the centre; if the marginal product falls short of the average product, the latter can be increased by reducing the size of the centre.

If all the centres or productive units tend to optimum size in this sense in the stationary state, that means that any obstacles arising either from the personal idiosyncrasies of the producer or the extent of his resources will be eliminated by time. That assumption is not a necessary consequence of the hypothesis of a stationary state. The hypothesis does not require that there should be no inequalities of capacity and resources among producers, but only that these inequalities should be perpetuated among their successors.

The point is of importance in its bearing on the theory of profit. The inequalities of incomes derived from profit arise mainly from inequalities in the size of enterprises. In any trade or industry the rate of profit tends to be such as to secure a reasonable income to the proprietors of the smallest surviving concerns. The same rate of profit may secure disproportionately great incomes to the proprietors of the largest concerns. If the concerns are all of optimum size or near it, these inequalities are eliminated. Even so it is not certain that the incomes derived from profit will be in a reasonable relation to other incomes, unless it can be assumed that a potential competitor can accumulate without difficulty the necessary capital resources to establish a concern of optimum size. If he can only secure enough capital to start a concern of one-half or one-tenth of optimum size, the prevailing rate of profit can be such as to secure the existing concerns incomes double or tenfold that which is just not so high as to attract competitors.

Professor Pigou introduces the theory of imperfect competition into his analysis, but limits its operation by assuming the goodwill based on "the preferences on the part of particular buyers for trading with particular sellers" as "smoothed away" in the stationary state. Only the price differences permitted by costs of transport remain (p. 245). R. G. H.

6.—*Abolish Slumps, a Diagnosis of the Trade Cycle.* By A. W. Knight. London: King, 1936. 7½" × 5". vi + 142 pp. 6*s*.

Mr. Knight tells us that as a "technician" he set out in search of economic truth, and it appears that, after having suffered many things at the hands of many economists, he found that precious jewel in the possession of Mr. J. M. Keynes. Yet Mr. Knight is no blind hero-worshipper; witness an implicit rebuke—quite undeserved—to the author of the *General Theory of Employment, Interest, and Money* on page 81. However, it is on Mr. Keynes's new identification of savings and investment that Mr. Knight builds his edifice, many of his bricks being taken from the works of Mr. Wesley Mitchell. There is much interesting arithmetic, from the analysis of which an enquiring student may derive benefit. There are also, for a "technician," some unproved hypotheses. For example :—"If, say, 19 per cent. of a nation's income were invested, would there be 19 per cent. of income recipients drawing incomes from the production of investment goods, the remaining 81 per cent. drawing incomes from the production of consumables? It seems so. Effective demand for investment of goods is 19, and that for consumables is 81 per cent. of the total. Hence if rates of wages, salaries, profits, rents, and interest are much the same in both groups, the numbers of income recipients in the groups will be as 19 is to 81." A gigantic supposition, but that is not all, for Mr. Knight, being granted his assumptions, concludes that "the percentage rate of saving of money from the total of incomes always remains at a constant figure"—this same 19 per cent. Maybe, maybe, but Mr. Keynes has taught us that "the propensity to consume is a fairly stable function," that "a higher absolute level of consumption will tend, as a rule, to widen the gap between income and consumption," and that "a greater *proportion* of income (will be) saved as real income increases."

Two serious defects are found in this book. No account appears to be taken of the effect of banking policy on industry, and there is no study of the actual facts of successive booms and slumps. No fluctuation in "the trade cycle" as we know it is like any other fluctuation in its details, although the coloration may be the same.

H. W. M.

7.—*The ABC of the Foreign Exchanges, a Practical Guide.* By George Clare and Norman Crump. London: Macmillan, 1936. 7¼" × 5". xxiii + 393 pp. 5*s*.

This is the tenth edition (not counting ten reprints of the fifth) of a book first published in 1892, and readers who were familiar with the early issues will find much difficulty in recognizing the once well-known volume in its new guise. Mr. Crump, in bringing out the sixth edition in 1924, was able to maintain that, "given the financial and economic conditions prevailing during and since the war, the exchange movements that have ensued confirm rather than confute the rules laid down in preceding years," but in 1931, in addition to bringing the history up-to-date, he had to deal with the stabilization of the franc, the Young Plan, the Bank of International Settlements, and new theories on gold stocks and the gold standard. By the time the present edition was in preparation he had to admit that "the theory and practice of the foreign exchanges have undergone numerous and startling changes." The departure of Britain from the gold standard, the Exchange Equalization Accounts of this and other countries, the abandonment of silver by China, the growth of systems of exchange restriction, the devaluation of the franc, the break-up of the gold *bloc*—these are some of the chief occurrences which have brought it about that "the last half of the book has been entirely rewritten." The headings of the chapters describing events since 1931 indicate sufficiently the comprehensive character of the revision: the 1931 crisis; the suspension of the gold standard; the Exchange Equalisation Account; the Empire Exchanges; the sterling area; the New York exchange, 1931–36; the pound-dollar-franc triangle; France and the gold *bloc*; the Berlin exchange, 1931–36—exchange restrictions; exchange clearings; the silver exchanges; the United States and silver; the rupee exchange. It is impossible to discuss here all the problems involved in these discussions, but it may be said emphatically that Mr. Crump has executed a competent piece of work. Nowadays it is by no means easy for an expert to find his way through the tangles of foreign exchange, but Mr. Crump has made it possible for the intelligent student to grasp the principles involved, and to realize both the advantages and the difficulties of a managed currency in an era of "economic nationalism," when all are anxious to sell but few to buy or at least to pay for what they have bought.

H. W. M.

8.—*Investment for Appreciation.* By L. L. B. Angas. London: Macmillan, 1936. 9" × 6". 353 pp. 20*s*.

In this book Major Angas considers the problems of the ordinary investor operating on the English and American Stock Exchanges.

He describes the types of analysis that are needed, and the technical questions confronting the investor, showing throughout the need for a reasoned approach.

The analytical matter which is spread through the earlier chapters and many of the appendices, is extremely wide in scope, but it is clear that the two chief phenomena which concern the author are the trade cycle and the shorter fluctuations due to the temporary over-valuation and under-valuation of shares following successive errors of optimism and pessimism. The rate of interest which is considered especially important is first shown to be no more than the price of money. Later, however, it appears that the prospective profit level is the " normal " major determinant of the long-term market rate of interest. But although the two factors frequently vary together, it is likely that the causal significance of the former is remote, acting as it must mainly through the demand for liquid assets. Indeed, the author admits exceptions, as when the distress demand for money at times of crisis causes a rise in interest rates when profits are falling. Again, the sources of supply of money are held to be the " bona fide " savings of the public and bank loans, a view which suggests that interest rates depend on the decisions of individuals to save or spend, whereas they are more usually considered to depend on the type of assets, liquid or otherwise, in which the public wishes to hold its stock of wealth—not simply its new savings. Such inconsistencies as these may perhaps make difficult reading of the more theoretical parts of the book, but do not greatly influence its practical conclusions.

Economic analysis having suggested a buying and selling policy suited to contemporary events, the author uses graphic methods to confirm expectations, and to time his operations. Throughout, and in common with other current theories of investment graph-reading, charts are used not only to gauge current movements and relationships, but also to forecast the probable trends of stocks in general, and even of shares in individual concerns. According to Major Angas, share prices when plotted on a ratio scale will normally follow a straight line, the sign of the slope depending largely on the state of trade. The slope must, of course, be altered from time to time as new data appear. He claims that the intermediate movements usually lie between lines parallel to the trend, and the short-term investor is advised to sell a share whose price reaches its higher parallel and buy a share whose price falls to its lower parallel. Elaborate rules are developed for reading charts amplifying the above principles, though these may be of little use to the English reader who has no investment chart service to supply him with materials. The statistician accustomed to accepted methods and the econometrist who has wrestled with the problems surrounding the analysis of cognate series may not feel confident of such simple methods of extrapolation. Nevertheless Major Angas and many others also well qualified to judge affirm that they work in practice. It is perhaps unfortunate that the book does not contain a single example of the application of these rules.

Coming to the technical suggestions of the book, which cover a wide ground, the need for rigid adherence to a definite policy is forcibly shown. Major Angas demonstrates how necessary it is not only to be normally correct in one's judgment of share movements, but also to have a rigid system for taking losses and conserving profits. He therefore treats in detail the considerations involved in the proper balancing of holdings, the placing of stop-loss orders, and the selection of assets of varying liquidity at different points of the trade cycle. The claims of automatic systems, such as averaging and pyramiding, are examined, and their drawbacks made clear. This part of the book concludes with a discussion of manipulation and sharp practices, which, while admittedly not general, form a definite danger to the inexperienced investor.

Most of the difficulties of the layman have by the end been considered. He is shown how to act in a way which is normally right, and the factors which must be kept in mind have been fully listed. It is likely, therefore, that this book will be of most use to those who are in need of a survey of practical problems but not unduly absorbed with questions of theory and scientific method. R. W. S.

9.—*Labour Conditions in Western Europe, 1820 to 1935.* By Jürgen Kuczynski. London: Lawrence and Wishart, 1937. 8½″ × 5¼″. viii + 118 pp. *4s. 6d.*

The author has assembled useful series of statistics of average wages and of retail price index numbers for England, Germany and France over more than a century; while those for England are almost entirely from familiar sources, those for the other countries are the result of painstaking research, and their publication makes the work of some importance. The earlier part of the book is entitled "The Measurement of Labour Conditions," and is devoted to an examination of the other factors that should be taken into account in assessing progress or retrogression. Many of these factors, such as the fatigue or intensity of work, are incommensurable; some, such as unemployment and loss of time through sickness, are commonly brought into the assessment of annual earnings, though the author seems to imply that they are neglected; others, such as the reduction of the death-rate and the change in environmental social conditions, can only be treated as supplementary data.

The author has a very strong bias in the direction of exaggerating injurious factors, such as the alleged unhealthiness of town as compared with country life, and the alleged increase in short-time, and of under-estimating the beneficial factors, such as the reduction in normal hours and the taking over of strenuous work by machinery. He holds the view that the capitalist dictates wages and conditions. The following quotation is an example: "This change of methods brought for the workers better food and fewer hours of work. It meant at the same time increasing intensity of work per hour. The body of the worker was not spared during this period, which stretches from the 'fifties to the end of last century. It only was handled more carefully in order to do a much more strenuous job: producing goods at a rate and at an intensity unforeseen in the previous period" (p. 111). It is not surprising to read on the next page that "To-day, labour conditions in England, in Germany, and in France, are undoubtedly and considerably worse than they were forty years ago. The purchasing power of the worker is smaller and the intensity of work is very much higher."

The last statement is not supported by the statistics on p. 73, where net real wages per unemployed and employed worker are given as 95 in 1895, 102 in 1935. In obtaining this figure, also, no account is taken of the well-known estimates that earnings in the period 1914–24 increased 95 per cent. (without allowance for unemployment), while the index of wage-rates increased only 76 per cent.; since the author refers to the original source of this estimate, he should have given reasons if he did not accept it. Nor does he point out that the wages of unskilled and of women have risen more than the average.

Great stress is laid on " relative " wages, by which is meant the relation of wages to other income. This has generally been taken as the proportion of total wage to total other income; the author prefers to reckon it per capita, which is more difficult, but is justifiable, and has been attempted before. But he does it by the formula which may be written $E/R : P.R/W$, where E stands for money wages per head, R for retail prices, P for national physical output per head, and W for wholesale prices, all expressed as index numbers. The justification for this formula is said to be that goods are bought at wholesale and sold at retail prices; but a formula that has as divisor the square of R cannot be right *a priori*. As an example of the working out, we may compare the periods 1909–14 and 1924–32. The index numbers used appear to be equivalent to $E = 167$, $R = 167$, $W = 138$ and $P = 93$, when those for the first period are taken as 100. Thus real wages (on the author's estimate) were stationary and physical production per head fell. So far it would be natural to say that wages had increased relatively. But $R/W = 1{\cdot}21$, and $P.R/W = 112$, so that by the formula " relative wages " had decreased about 12 per cent. The factor R/W seems to be quite unjustifiable in this connection. Retail prices rose relatively to wholesale prices owing to increasing wages in manufacture and distribution, while the formula appears to assume that the whole of the difference goes to non-wage-earners.

With the care that has been taken to use or refer to all sources, it is unfortunate that M. Simiand's great work *Le Salaire* has been overlooked. A. L. B.

10.—*The World Agricultural Situation in* 1934–35—International Institute of Agriculture; Rome, 1936. $9\frac{1}{2}'' \times 7''$. viii + 533 pp. 25 *lire*.

The importance of the first section of this Report, dealing with " the Changing Structure of World Economy," justifies a notice of it under "Reviews" instead of under " Statistical Notes," for this semi-official publication takes it as established that the old basis of international production and trade, as determined by comparative costs, has been definitely and permanently given up in favour of a planned economy on national lines and supported by non-economic reasons. Although the extreme doctrine of economic self-sufficiency is demonstrably absurd, " the policy of economic particularism and isolation, far from being abandoned, actually gains in strength," and " the world, for several years now, has definitely embarked upon a far-reaching process of economic transformation involving the substitution of planning and control for competition and the breaking-up of the world market into a vast number of closed national units." All countries try to restrict their imports, and " have to organize their foreign trade in such a way as to secure their supplies and their markets against contingencies." Thus we have preferential arrangements between a mother-country and her colonies, bilateral trade agreements, and the attempted creation of trading combinations of countries with common political and economic interests, but " economic allegiances in our rapidly changing world are as much subject to unexpected shifts as political orientations." On the one hand, there is a struggle for colonial expansion to obtain raw materials and markets, and, on the other hand, there is a great stimulus to technical invention of home-made substitutes for imported primary commodities.

Agricultural countries have in turn to " face the problem of themselves achieving economic self-sufficiency by developing their existing industries and by creating new ones on the basis of their available natural resources." The only possibility of obtaining markets for their agricultural products, now unwanted in international trade, is to create new markets at home by industrialization. " There are very few agricultural countries which can aspire to develop a fully balanced economic organization within their own boundaries ". In such exceptional cases the problem of economic equilibrium resolves itself simply into a question of developing the primary and manufacturing industries to the extent justified by the available resources; such countries are the United States, Russia, and eventually China and India. Other countries, rich in natural resources, but stinted in population, such as Canada, Australia, South Africa, and the countries of South America, can and do proceed with industrialization, but " it cannot be said to possess that logical consistency and continuity which distinguishes the same process in countries more densely populated." " A different case is that of old densely populated agricultural countries, which often possess a long tradition of craftsmanship, as well as abundant supplies of cheap labour, but which are largely dependent upon imported raw materials. For such countries, industrialization is a vital necessity, since on the meagre national income derived from agriculture they cannot maintain the costly machinery of a modern State." Such countries are Japan and Poland, and the markets they will first invade will be those capable of absorbing large quantities of mass-made goods, of low grade but cheap. International trade must diminish with the restriction of the trade in agricultural products, but " the value of trade may be increased, since the trade will involve more valuable goods." And, finally, " in discussing this very complicated problem, one should be careful to avoid losing the sense of perspective and explaining events which take place to-day by phenomena and conditions which may come into play in a more or less distant future." Altogether, these 20 pages are most admirable and contain material for many volumes of exposition and of criticism.

The remainder of the volume contains first a general review of the economic conditions of 1934-35 "leading to a diminution in the supply of basic agricultural products," of notes on the market conditions affecting each of the important products of agriculture, and of a review of agricultural policy and conditions in each of 31 countries.

H. W. M.

11.—*The Marketing of Australian and New Zealand Primary Products.* By W. Millar Smith, Ph.D. (Lond.), with a foreword by J. Coatmain, C.I.E. London: Sir Isaac Pitman and Sons, Ltd., 1936. 8½" × 5¼". 352 pp. 12*s.* 6*d.*

The impetus to large-scale marketing given by the difficulties of conducting trade under war conditions has, all over the world, prompted economic experiment of a nature and on a scale never before contemplated. In New Zealand and Australia this has perhaps been specially the case: war-time experience accustomed producers to stabilized prices and equalized returns, and favoured the idea that mass marketing offered a simple solution of the troubles of the producer, more especially as the large proportion of the Dominion production sold for export facilitated and seemed to demand organized control.

From this initial point of view have ensued great developments which form the basis of this work. Opening with a review of the historical background, followed by a useful chapter on the legal aspects of marketing, the work proceeds to an examination of the marketing control organization, and then to the structure of the markets for the main products, such as wool, wheat, dairy produce and meat, with a section dealing separately with co-operative marketing. Space is also given to a discussion of the Ottawa Agreement and the future of inter-Imperial trade. As a summary view of the position the book can be read with benefit by everyone interested in any way in the marketing of Dominion produce, especially perhaps as regards its export to this country. In a later portion of the book, Dr. Millar Smith ranges further afield, and criticizes at some length the measures, economic and political, which have been taken at various times to cope with the agricultural problem in the Dominions, such as tariffs, subsidies, reduction of mortgages on land, devaluation, etc. Most of the steps so far taken, in his opinion, "aim at protecting existing production and the commercial interests associated with it." They are not concerned, he says, "with securing a higher social dividend for all, but rather in reserving the benefits of monopoly for the few." His own remedy, one infers, would be some species of *laisser faire*, which would allow economic problems to work themselves out in a more natural manner and with less interference by the State. "The danger in New Zealand, and to a less degree in Australia, is that an aggressive agrarianism will hinder those developments which are necessary for the restoration of prosperity, but which may involve temporary loss to farmers and their middlemen dependants." As a broad statement this is probably true: its application in practice is another matter. In fact, while Dr. Smith's candid comments on many features of Dominion policy make interesting reading, there is a tendency to be too polemical and diffuse. A more deliberate method of treatment would probably have been more convincing.

There is an excellent bibliography and an index.

R. J. T.

12.—*Mines, Machines and Men.* By W. D. Stewart. London: P. S. King, 1935. 7¼″ × 4¾″. xii + 180 pp. 6*s*.

This volume is the statement of a claim by the author, who has had practical experience of coal-mining and a lifelong association with miners, that mining conditions for the workers and for the industry in general have deteriorated considerably since the Great War. It is admitted that the statement is mainly from the point of view of the miners, but their case is on the whole very fairly argued, although it is often implied, if not at times even contended, that most of the legislation enacted during the last twenty-five years with a view to improving the working conditions has as often as not acted adversely.

The two great changes in the coal-mining industry during the present century have been the large increase in the size of the business unit, *i.e.*, amalgamations of pits and colliery companies, and the introduction in increasing degree of coal-cutting machines and other mechanical means of production. Neither of these changes, the author contends, is necessarily an advantage to the industry as a whole, either economically or, from the point of view of the workers, as regards safety, health, improved working conditions or earnings. It may be granted quite readily that larger business units do not necessarily produce greater efficiency and economies. In view also of the great differences as to thickness of seams and faults, even in the same coalfield, the amalgamation of collieries under the same control is far from securing uniformity in the management or in the practical working of the mines, and this apart altogether from the variations in working methods necessary on account of the difference in the ages of the pits. Yet one feels that although the maximum business unit is far from being necessarily the optimum, the large number of smaller units is in most cases a great hindrance both to economical production and the satisfactory marketing of the product. It is clear, we should have thought, that on balance the multiplicity of small concerns was a disadvantage as regards efficiency and economical working, and in the table showing production according to size of pit on p. 11, the greater proportionate output and lower costs of the larger units are too pronounced to be disposed of by the author as due to not taking into account the relative ages of the pits. As regards coal-cutting machinery, the author declines to believe that its effect is to lower the costs of production ultimately, although, if this were not the case, there would have been no incentive to its introduction, and this point must have been thoroughly considered by coal-owners. On the other hand, it is, no doubt, the case that the labour of the individual workman has not been lightened. The statement also is made that, alongside with the increase of machine work, there has been an increase in the accident rate through falls of roof and coal at the coal-face. Whether one is the cause of the other will perhaps be settled when the Royal Commission on Safety in Coal Mines reports. The very disturbing increase in the incidence of miners' nystagmus is, no doubt, being considered by the Commission, and in regard to this the author considers the increase due, at least partially, to the increased amount of coal dust from the machines, and the consequent reduced safety-lamp luminosity. A chapter is devoted to the coal strikes of 1921 and 1926, and another to the methods of payment of wages. The latter chapter is most illuminating and indicates quite clearly how difficult a task it would be to invent any generally acceptable uniform piece-list even for separate coalfields. At present the standard rates for the various districts are based on agreements arrived at over a period of more than fifty years, one going back to 1879 and some to 1888. It can surely not be beyond the capacity of the industry to bring some greater uniformity of standard to the method of payment of wages, although it is plain that it would be the subject of prolonged negotiation, and could perhaps only be achieved in a period of definitely rising wages. W. A. B.

13.—*Building Society Practice.* By G. S. Riley. London: Macmillan, 1935. 9″ × $5\frac{1}{2}$″. 228 pp. 10*s.* 6*d.*

The lack of any serious attempt "to set out in detail the organization and practical working of a modern building society" led the author to write this book "in the interests of all those whose careers are bound up with the building-society movement." Building societies are so immensely diverse in size and business method that to deal with all cases is an impossibility, but the practice herein described can be used as a model and adapted to the needs of any society, large or small.

The author, after a brief historical sketch of the development of the movement and its legal regulation, goes on to describe the chief personnel of a society, with their responsibilities and qualifications, the various departments on the investment and on the mortgage side, and the management of branches. He closes with three chapters on the special income-tax arrangement, the application of machinery to the work (tabulating machines, etc.), and the annual audit. Throughout there are helpful suggestions of devices to ensure accuracy and eliminate fraud, with examples of ledger rulings. Practice only is discussed; on the subject of policy any remarks are incidental.

The attitude of the book is progressive, especially in stressing the need for statistical information before deciding on policy, and the material—in contrast to much building-society literature—is extremely condensed. Anyone who wishes to study building-society routine, or those actually running or thinking of running a society, will find the book a necessity. It is interesting to note, however, that the fundamental assumption of the work is that the average building society is an expanding one. There can be small doubt that the movement will soon be faced with a decline following the termination of the house-building boom for the middle classes, in which the majority of societies will find their business contracting. Mr. Riley does not deal with other possible outlets for funds, or the closing of branches, cut-throat competition for business, or large-scale repayment of shares that may be expected then to occur. R. W. S.

14.—*The Social Services: a Historical Survey.* By W. Hardy Wickwar. London: Cobden-Sanderson, 1936. 8½″ × 5½″. 268 pp. 10*s.* 6*d.*

The author covers a vast territory in relatively few pages, as is indicated by the several chapters—genesis of the social services; poor relief; education; public health; natural contingencies, including sickness, old age and others; unemployment; the social service state, including administrative law and administrative justice; state and society, including the layman and the expert and the rule of reason. A heavy programme, considering that the author deals with not only the present position, but also the history of the services—a cinematographic record, not free from some of the faults of the screen: it is absurd to say, for instance, that "the local government history of this country in the nineteenth century is dominated by the search for a *tertium quid* between county and parish" (p. 213), important as was this question during part of the period. The book is brightly written, perhaps a little too smartly, but the reviewer did not find it altogether easy reading; it jumps too rapidly from fact to fact, and reading it feels like watching a grasshopper leaping from place to place. It is crammed with facts interesting to the layman, and many of them will come freshly even to those familiar with the subject. For a proper understanding of the history of the social services, more of the social setting of the times is necessary than has been given by the author. He is also too content to accept services at their face value, and there is little indication of the problems which they contain. The author tells us that he wrote the book because he failed to find for his own purposes any short history of the social services, and, within its limits, he has produced a volume well worth perusal. G.

15.- *Letters to Thomas Robert Malthus on Political Economy and Stagnation of Commerce.* By Jean Baptiste Say. (Translated 1821.) With Historical Preface by Harold J. Laski. London: G. Harding, 1936. 8¾″ × 5¾″. 75 pp. 5*s.*

This is the second of the Wheeler Reprints (Economic and Historical), of which the first had been on English Monetary History 1626 to 1730, edited by W. A. Shaw. The second is a careful reprint of a contemporary translation from the French of 1821, the only addition being a skilful explanatory Preface by Prof. Harold Laski which strikes the keynote of the controversy following it in a helpful manner. The "Letters" are really chapters of a small volume in which the opposing views of Malthus and Say are discussed as in a formal treatise. They have not the free-and-easy play of Ricardo's Letters to Malthus, now grave, now gay. But

Say, as a Frenchman, cannot help being less painfully serious than an Englishman even when discussing a serious subject. Malthus had been all his lifetime a man of letters; Say, in his lifetime nearly a contemporary of Malthus (1767–1832) had experienced change after change of occupation, making it very unlikely he could be a commonplace writer when he took pen in hand. He had been journalist and man of business. In 1792 he had been in the French army. Some years later he became a mechanician introducing into France her first cotton-mill, not as a mere capitalist and *entrepreneur* but as a builder of machines of which he had explored the working in England.

By that time he had written on economics and become known personally to Ricardo and his friends. After various trial-flights in economic writing, he became famous first in his own country, then in England. In some ways his career was an excellent drill for his latest work as a teacher and theorist. In this last capacity he was controversialist to the end. Not content with the Letters to Malthus, he wrote an *Examen Critique* of J. R. MacCulloch in 1825 (see *Œuvres Diverses*, pp. 261 *seq.*, edition 1848). Adam Smith had always inspired him, but never as dictator, rather as the master who taught him the best lesson of a master, how to go on by himself. " Appuyé sur sa *Richesse des Nations* (qui nous découvre en même temps la richesse de son génie) j'appris à marcher seul " (Transl. p. 20, French in *Œuvres Choisies*, 455). He had always the courage of his opinions even as against the great Ricardo and Malthus. Readers must judge for themselves if these opinions are exaggerated or weakly supported; for example, was this prophecy ever fulfilled? "Thanks to Adam Smith, the most vague, the most obscure of sciences will soon become the most precise and that which of all others will leave the fewest points unexplained" (Transl. p. 20, *Œuvres*, Ch. 455). After this, another prophecy will surprise us less, that New Orleans is destined to be one of the greatest depôts in the whole world (*ibid.*, p. 52). But there is sound sense in the dicta now and then, for example, " What we give to the Public is to tell them how and why such a fact is the consequence of such another fact; whether they court or dread the consequence, it is sufficient for them; they know what they have to do." But, he adds, let us have " no exhortations " to do this or that (p. 33). " A good political economy recommends little " (p. 38), perhaps (we may add) a good statistical study still less. There is something for both of these brethren, the economist and the statistician, to digest in Say's most dogmatic dicta. Most of our readers know less about Jean Baptiste Say than they do about Thomas Robert Malthus, always well remembered by Statisticians as one of the founders of their Society. The facts about Say are worth knowing accordingly, though the record has left little space for the Letters. Here are their themes.

The first letter or chapter deals with a first principle: " As no one can purchase the produce of another except with his own produce, as the amount for which we can buy is equal to that which we can produce; the more we can produce, the more we can purchase. If certain commodities do not sell, it is because others are not produced; and it is the raising of produce which alone opens a market for the sale of produce" (*ibid.*, 3). This principle is to be turned against Malthus and his belief in a General Glut. Say is assuming at the start that there is an unrestricted market.

The second letter or chapter attacks that idea of a General Glut which Malthus had put prominently forward in his *Principles of Political Economy*, published about a year before the Letters. One of Say's amusing passages in this connection is an attempt to set the Essay on Population against the sections on Gluts in the *Political Economy*.*

The third allows that the freedom from restraints assumed in theory (in Letters I. and II.) does not really exist. Obstacles of various kinds are now disturbing it, that of Governments being one of the worst (compare p. 39).

The fourth deals mainly with Machinery and its effects and defects, a subject which (as we have seen from his life) he was particularly well qualified to handle. In this chapter he gives many interesting illustrations (*e.g.* from flour-mills and from stocking looms) mainly against Sismondi.

The fifth is on Value, its definition and phases. Here his chief adversary is Ricardo; Malthus is for the most part with Say himself. Say would confine the term value to value in exchange. The conclusion (75) is very characteristic: "You see I am not afraid to reduce my pretended paradoxes † to their simple expression. I strip them naked and trust them to your equity, to that of Mr. Ricardo, and to the good sense of the public. But at the same time reserving to myself the right of explaining them if they are ill understood, and of defending them boldly if unjustly attacked."

English readers may notice some unusual words, such as "vent" for "sale," "industrious" for "industrial," and some quaintness of construction (as on p. 45 foot). They must not stumble over "enterpriser" for *entrepreneur*; many of us wish that we had it still. The translation leaves a just impression of the original; and if the English of 1821 seems now and again a little old-fashioned, it will be hard to find any sentence which, "after due examination," can be pronounced unintelligible. After only one hundred years (or little more) it should not be otherwise; but it is not every translation of an economic book of our own day that can pass test so well. J. B.

16.—*Paradoxes Inédits du Seigneur de Malestroit touchant les Monnoyes avec la response du Président de la Tourette*, a cura di Luigi Einaudi. Torino: G. Einaudi, 1937. 10″ × 7½″. xv + 164 pp. L. 40.

In spite of this title, the volume of Signor Einaudi contains much more than "Malestroit's monetary Paradoxes hitherto unpublished."

---

* Sections II. and III. of Ch. VII., *Political Economy*, 1820, pp. 353 *seq.* Compare the anticipation of Say's dilemma, p. 347.

† The "paradoxes" were exhibited in the very first Letters—p. 15, "immaterial produce," "productive service" as he uses it, pp. 12, 13, cf. II. 31. Like Bastiat later, he finds the flexible word "service" a power to charm with.

There is an analysis of these already published (first and second edition, 1566, 1567); there is a bibliography showing what has been already written on kindred subjects; there is a glossary dealing with the occasional strange words in the manuscript. But the central figure is the second series, the "Paradoxes" of the title-page, called by its finder "MS. E." (see Manuscript Einaudi, pp. 87 *seq*; compare 31, note 2), the date 1567. A close study of the first set of Paradoxes had led Einaudi to suspect the existence somewhere of the second (31, 32). Then he cried Eureka over a bundle of monetary tracts in the shop of Magis and Mounaud, second-hand booksellers in Paris. From their hands it passed into his in February 1935, to repose in his valuable economic library at Turin, with other treasures. The bundle bore the title: "Extrait des remonstrances, mémoires, advis, et réponses sur le fait des monaies [sic] depuis l'année 1540 jusques en l'année 1615."

It was a prize indeed. "I found myself confronted with a [manuscript] copy of an article till now unpublished and so far as I know not even mentioned by the economists occupied in the controversy 'Malestroit–Bodin' and the other monetary debates at the end of the sixteenth century" (Einaudi, p. 31). "The 'Extract' is a large manuscript in paper, 4to size, binding full calf, 825 pages, 812 of text, 13 of index, handwriting small fine and uniform, not older than 1690." Only the first two mémoires, viz., from 1530 to 1540, are contemporary 'extracts'"; the others are copies of later date, and by copyists who occasionally shorten them. There was much beyond what was wanted by Einaudi.

We may call the Malestroit–Bodin controversy an episode in the history of currency in relation to the discovery of America in 1492 and its consequences for the precious metals thereafter. Of Malestroit himself we know very little. Einaudi thus writes of him (Ein. 1937, pp. 20, 21): "A puzzling person this Signor de Malestroit, anxious to explain the events of his time and impatient of commonly received opinions, setting against them his Paradoxes, or startling opinions, but a person solid enough to be a councillor of the [French] King and a master in ordinary of the Chamber of Royal Accounts." * A modern historian, L. Hauser, observed, in 1905, that in a manuscript note to the second edition, 1568, of the first Paradoxes, the name is given in full, "M. Jehan Cherruyt Signor de Malestroitet"; but L. Hauser failed to find further notice of him in the cabinet of MSS. in the Paris Library. Another modern writer, Le Branchu, is distressed that a man who had stood before kings should be so forgotten by history, and points out that he must have died between 1568, when he was "Monsieur," and 1578, when he is simple "Malestroit." †

Even Signor Einaudi does not deny that Malestroit is mainly remembered because of his association with Jean Bodin ‡ (b. at Angers,

---

* Perhaps therefore *inter alia* controller of the Mint.

† Einaudi, 1937, pp. 20, 21. The above free translation somewhat abridges the text.

‡ See Baudrillart, *Jean Bodin et son Temps*, 1853. Father of modern political science and philosophy of history.

1520, d. of the plague at Laon, 1596). They stand to each other as Boyle to Bentley [*] over a century after them, with a large reservation in favour of Malestroit, who knew perfectly well what he was doing. He labours to show that the increase in prices (which was a matter of general remark even before 1566,[†] the year of the first Paradoxes) was only an apparent rise. He insisted in calling it "nominal," due to the degradation of the coinage by criminals and kings, the coinage having really (he thinks) remained stable for 300 years. He thinks that to-day's is what yesterday it was; to-morrow it shall not be less. There was no statistical proof one way or other till 1687, when Hamburg led the way (see *Palgrave's Dict.*, vol. III., second edition, 1926, p. 182) by giving prices, gold and silver, in a yearly circular. Till then there were little better than rough estimates and guesses. Jean Bodin has the credit of being the first economist to recognize (in 1568) [‡] the American increased production of the precious metals as by far the greatest cause of the fall in money and rise in prices. His realism overthrew Malestroit's "nominalism," the "real" element being the new American discoveries, so far as even a good head like Bodin's could take stock of them without statistics. Einaudi quotes sparingly from Bodin on the ground, more plausible perhaps in his country than with us here, that every schoolboy knows all about Bodin already. Still he could not be quite left out, since his Reply to Malestroit contains part of Einaudi's proof for the authenticity of his "MS. E.", the retrieved new Paradoxes in the book before us. We get enough citation to see the points clearly (*e.g.* p. 26). Signor Einaudi again and again shows his wide range of powers. There is a human touch in his tribute "a mia cara Ida" which we can all appreciate (first of the two prefaces, dated Sept. 1936).

As the book appeals both to economists and to historians, it deserves translation into English, and can hardly fail to have it.

J. B.

17.—*Other New Publications.*

Institute of Actuaries and Faculty of Actuaries. Continuous Investigation into Mortality of Assured Lives, 1924–29. Monetary Tables, Vol. II, 1935. 225 pp. 52*s.* 6*d.* A 1924–29 Light and A 1924–29 Heavy: Mortality Functions and Monetary Tables, 1936. Cambridge University Press. 10″ × 6″. 147 pp. 42*s.*

[The first of these volumes is the third of the Investigations, the preceding two of which—namely, "Statistics" and "Monetary Tables" (I)—were reviewed in the *Journal*, Part III, 1935. The Monetary Tables in this second section relate to functions and less frequent use, and the tables are limited to seven rates of interest—2½, 3, 4, 4½, 5, and 6 per cent. Policy values occupy the greater part of the book.

The tables in the second of the volumes before us have been prepared from the statistics of the seven offices contributing to the Investigations which showed the lightest mortality and the five which showed the heaviest, in order to give some idea of the variation in mortality experienced.]

---

[*] See Macaulay's Essay on "Temple" *sub fine.*

[†] Potosi had begun its effects on silver 1545 *seq.*

[‡] Ein., p. 19, note I, II. Compare especially 24, 25. His friends spoke of a flash of economic inspiration on his part. There is such a thing; but it is not of the sort to suffer by the help of Hamburg statistics, had they been available in 1568. Compare Baudrillart, 169.

Istituto Centrale di Statistica: Decennale 1926, IV–1936, XIV. Roma: Istituto Poligrafico dello Stata, 1936. 11⅓″ × 9″. 154 + 172 pp. L. 50.

[The Central Statistical Institute of Italy has celebrated the completion of its first decade by the publication of a massive volume, giving a full account of its inception, scope, and organization, and of the work so far accomplished. This occupies Part I, while Part II consists of a historical sketch of Italian official statistics from the middle of the 18th century to 1926, when the Institute was founded by Mussolini, and, from being a sub-department of the Ministry of Finance, became an autonomous Department directly dependent upon the Head of the State. The volume opens with two pronouncements by Mussolini: "Statistics are always worth more than speeches," and "in large modern societies neither a private undertaking nor a State can be administered without the help of statistics," and the first chapter is an elaborate tribute to the Duce for the part he played in the reorganization of the whole system of Italian statistics, the goal of which is a gradual centralization of all the statistics of the Kingdom in order that those responsible for the regulation of the corporative economy may be accurately informed. The complex organization of the Institute is diagrammatically set out and described in great detail. The fourth chapter opens with a list of the enquiries undertaken, followed with examples of the procedure employed and some descriptive comment. The enquiries include six censuses (two of population, three agricultural, and one industrial and commercial) and various investigations into subjects of national importance—for example, fertility, rural housing, size of families, etc.—and the Institute has printed altogether about 100,000 pages of text and tables. The present volume is liberally illustrated with photographs; it is symbolically Roman in size and weight, and most satisfactorily Roman in its typography.]

Johns Hopkins University. Collected Papers from the Department of Biology of the School of Hygiene and Public Health. Baltimore, 1936. 9⅝″ × 6⅝″. Vol. XIII.

[As in previous volumes, the collected papers include a number by Professor Raymond Pearl, and several of them, dealing with the growth and distribution of the world's population, are of especial interest just now. In them he sets out the facts which must be at once the basis and the corrective of any useful speculation on the future, with lucid commentary in simple language. The first of these papers, "War and Overpopulation," compares the population densities of various countries and, finally, of nine "empires," and the figures, of themselves, show the superficiality of some current assumptions. "Multiplying Man" is a brief but highly instructive discussion of the present rates of population growth in the principal countries of the world and in the world as a whole. These two papers are "popular" in treatment. "World Population Growth" is of a more technical nature; it embodies the latest results of the Department's annual revision of World Population, discusses the present trend and the possible inferences for the future which may be derived from the past, and draws some "tentative" conclusions. These papers are followed by the third "Progress Report in a Study of Family Limitation" and "Fertility and Contraception in Labour Whites and Negroes." Other contributions by Professor Pearl are "The incidence of tuberculosis in the offspring of tuberculous parents"; and "Constitutional factors in diseases of the cardio-vascular-renal system."

Among other papers in the volume are A. Ciocco's third "Study on

Constitution," dealing with somatological differences associated with diseases of the heart in females, and his "Historical Background of the Modern Study of Constitution"; also Studies in Population Physiology (V and VI) carried out on *Tribolium Confusum Duval* by Thomas Park, and examining, respectively, oxygen consumption and the effect on fecundity and fertility of food conditioning.]

Marshall (A. H.). Local Authorities: Internal Financial Control. London: Institute of Public Administration, 1936. 9½" × 6½". 218 pp. 7*s.* 6*d.*

[The data on which this work is based were obtained by investigating the actual practice of local authorities. Answers to a detailed questionnaire were furnished by eighty-six such bodies, comprising County Boroughs, other Boroughs, County Councils, Urban and Rural District Councils, and Metropolitan Authorities in England and Wales, half a dozen authorities in Scotland and one in Northern Ireland. As a preliminary, the author sets out the principles of financial control, which he classifies as routine control or the machinery for securing correct administration, financial information regarding work carried out, and financial advice or the working out of the probable financial effects of proposals for future action. The first two chapters deal with Statutory regulations and orders and internal regulations; successive chapters describe the work of the Finance Committee and Chief Financial Officer, budgetary procedure and control, the placing of orders and contracts, methods of payment, control of income, accounting and costing methods. In the appendices the author provides suggestions for standing orders, deals with the duties of the Treasurer, and describes the form of the principal published costing returns. The book is a storehouse of information not otherwise readily accessible and is fully indexed.]

Swan (Joseph P.). The Vaccination Problem. London: C. W. Daniel Co., 1936. 8⅝" × 5½". 346 pp. 5*s.*

[In spite of the title, this book does not profess to be the impartial examination of a problem, but is, as the author says in his preface, the statement of a case—the case against vaccination—continuing and bringing up to date the work of William White, published in 1885. Many facts and figures have been assembled in order to substantiate Mr. Swan's contention that "smallpox is a disease produced by insanitary conditions and that therefore it can only be effectively eradicated by the abolition of those conditions." An appendix gives extracts from writings by medical men giving opinions for and against vaccination which are arranged in parallel columns. There is a full index.]

STATISTICAL NOTES.

1. British Official Statistics.

On page 326 we give our usual table summarizing the oversea trade of the United Kingdom for the years ended February, 1933 and 1937. During 1936 there was a rapid increase in the excess of imports over exports of merchandise, averaging over £6 million a month. The increase during the first two months of this year was much smaller, averaging only £2·4 million a month. The increase in the excess of imports over exports from £52·6 million to £57·5 million resulted from a rise of about £13 million in retained imports and £8 million in exports of United Kingdom goods, the increase in each case being about 11 per cent.

Total imports during January and February, 1937, were valued at £147,139,000 as compared with £132,131,000 a year earlier. Re-exports increased in value from £9,967,000 to £12,030,000, as a result mainly of the greater value of the hides and skins, wool and rubber re-exported. These increases were essentially due to higher prices, there being an increase in quantity only in respect of hides and skins. The value of goods transhipped under bond, which are not included among the records of imports and re-exports, were higher in both January and February than in any earlier month, reaching a total of £6,041,000 as compared with £4,442,000 in the first two months of 1936.

The value of retained imports of food, drink and tobacco amounted to £60,683,000, being £3,876,000 more than a year earlier. There was a very marked rise of £4,531,000 (nearly 50 per cent.) in imports of grain and flour, though the quantity imported rose only by 6 per cent. Average values of wheat, wheat meal and flour, barley and maize rose to the highest figures recorded since 1930. Wheat and maize were imported in larger quantities than a year earlier, but imports of barley declined. The next largest rise in value was £869,000 (7 per cent.) in respect of meat, but in this case the rise was due to an increase in the quantities of beef, mutton and lamb, and bacon imported, average values in each case being slightly lower than in January–February, 1936. The principal changes among other commodities in this class were declines in imports of eggs, apples, tinned fruit, tea, sugar and tobacco, a marked increase in imports of oranges, and a decline of 19 per cent. in the quantity of cocoa imported, while the value rose by 71 per cent.

Retained imports of raw materials rose by £4,638,000 to £40,111,000. The largest increases were in respect of wool, cotton, wood and timber, oil seeds, oils, etc., other textile materials (except silk) and hides and skins, in each case except wool due to a rise in quantities as well as in average values. For wool, retained imports were smaller than a year earlier, but the value rose by £1·1 million. Re-exports of rubber exceeded imports both in quantity and value, as had been the case for most of the preceding ten months.

An increase from £29,310,000 to £33,658,000 was recorded in retained imports of articles wholly or mainly manufactured. Only four groups showed declines, the largest being £295,000 in respect of iron and steel. Retained imports of non-ferrous metals increased by £1,958,000, due partly to larger imports of copper and zinc, but mainly to higher prices, while imports of machinery rose by £1,025,000, machine tools showing a striking increase.

Exports of United Kingdom goods during the first two months of this year were valued at £77,656,000, being £8,092,000 more than a year earlier. An increase of £851,000 in exports of food, drink and tobacco was due mainly to larger exports of spirits. The increase in exports of raw materials, aggregating £1,768,000, applied to most groups in this class, the only three declines being insignificant. The rise was mainly in exports of raw and waste wool and woollen rags, larger quantities being exported at higher prices. Exports of coal increased in value by £340,000 (8 per cent.), the quantity rising by 222,000 tons (4 per cent.). Changes of major importance were an increase from 1,143,000 tons to 1,637,000 tons in exports to France and from 26,000 tons to 156,000 tons in exports to Italy. There was an increase of £5,414,000 (10 per cent.) in exports of manufactures; apart from silk yarns and manufactures and rubber manufactures, for which declines under £3,000 were recorded, the increase was general. The largest increases in value were recorded for iron and steel (£1,332,000) and vehicles (£895,000); for chemicals, etc., woollen and worsted yarns and manufactures, and manufactures of textile materials other than cotton, wool and silk, there was an increase of between £400,000 and £500,000.

The increase in value of the exports of iron and steel resulted from an increase in quantity of 83,000 tons (25 per cent.), there being little change in average values. Practically all descriptions of iron and steel goods shared in the increase, the only important exception being cast pipes. Exports of machinery declined by 1,800 tons (3 per cent.). Textile machinery continued to show a decline, and exports of mining machinery and machine tools were also much less than in the first two months of 1936. There was, on the other hand, a marked increase in exports of agricultural tractors. The principal increases in the vehicles group were recorded for motor-cars and chassis, pedal cycles, and rubber tyres, though motor cycles and ships and boats also showed some increase.

Among textiles, exports of cotton yarns were about the same as a year earlier, but exports of cotton piece goods declined by 15 million square yards, there being a further fall of 22 million square yards in exports to India. Among the increases, those for Australia and the Dutch East Indies were the most important. The quantity of wool tops and woollen and worsted yarns exported showed a decline; exports of woollen and worsted tissues and carpets were somewhat higher than a year earlier. There was a substantial increase in exports of artificial silk piece goods, and exports of linen piece goods continued to expand.

Imports of bullion and specie during January and February amounted to £55·0 million and exports to £37·4 million, the import excess of £17·6 million comparing with one of £18·2 million a year earlier.

A new base year has been established by the Board of Trade for making comparisons of the volume and value of the oversea trade of the United Kingdom. In future the prices prevailing in 1935 will be used in place of those ruling in 1930. In the first article on the subject which appears in the *Board of Trade Journal* (H.M.S.O., 6*d.*) on 4th March, the trade of the new base year is compared with that of the old base year on the basis of both 1930 and of 1935 prices. At the same time, the trade of 1936 is compared with that of 1930 and 1935 on the basis of 1935 prices.

The Board of Trade have issued Part I of the *Report on the Import Duties Act Inquiry*, 1934, in a volume of xii + 386 pages (price 6*s.*), covering 15 textile trades, 6 leather and clothing trades, 5 food trades, 9 chemical and allied trades, and 12 miscellaneous trades. The general character of the report is similar to those issued on the Censuses of Production, but it should be noted that "net output" is now defined more closely as "the figure which results from deducting from the value of the gross output the aggregate of the 'Cost of materials used' and the amount paid for 'Work given out,' together with the amount of any Excise duty included in the value of the products, and not in that of the materials used." The Excise duty, when charged, is shown separately. In the textile trades as a whole the net output per person employed rose from £139 in 1930 to £144 in 1934 and the production index at 1930 average values was 126 in 1934 compared with 100 in 1930 and 123 in 1924; the number of persons employed nevertheless fell from 1,045,140 in 1930 to 1,025,926 in 1934. The six leather and clothing trades did not show so good a result, net output per head having fallen from £179 in 1930 to £163 in 1934, although the production index was 7 per cent. greater than in 1930 and 10 per cent. greater than in 1924, and employment had declined by only about 1 per cent. The five food trades recorded an increase in net output per head from £317 in 1930 to £321 in 1934, but the growth in the production index was more rapid, being in 1934 20 per cent. above that for 1930 and 29 per cent. above that for 1924, and the average number of persons employed rose from 123,917 in 1930 to 138,216 in 1934. In ten chemical and allied trades the net output per head rose from £391 in 1930 to £434 in 1934, the production index was greater by 20 per cent. (25 per cent. over 1924), and the number of persons employed rose from 167,719 to 174,134. In nine miscellaneous trades the net output per head rose from £238 in 1930 to £242 in 1934, the production index from 100 to 126 (84 in 1924), and the persons employed from 123,672 to 131,035; in three other trades not included in the Inquiry for 1933 the net output per head fell from £272 in 1930 to £235 in 1934 and the number employed from 47,545 to 37,925, while the production index was 14 per cent. above that for 1930 and 42·5 per cent. over that for 1924. At the end is given a summary table showing as far as is possible comparative results for the Inquiries of 1933 and 1934 and the Census of Production for 1930 relating to the same trades. Factory trades employing 3,219,998 persons in 1930, 3,015,761 in 1933, and 3,215,828 in 1934, yielded average net outputs per head of £197, £198 and £207 in these three years respectively, while factory trades not included in the 1933 Inquiry employed 245,180 persons in 1930 and 241,200 in 1934, and their net output per head fell from £240 to £236. The general improvement between 1930 and 1934 is manifested by these figures; even in cotton-spinning and in cotton-weaving the net output per head rose from £104 to £112 and from £117 to £120 respectively, and the production indices, though far below those for 1924, showed increases of 13 and 10 per cent. respectively over 1930.

Movements and Classes.	Twelve Months ended February 1936.	Twelve Months ended February 1937	Increase (+) or Decrease (–).
Imports, c.i.f.—	£'000.	£'000.	£'000.
Food, drink and tobacco	359,819	386,575	(+) 26,756
Raw materials and articles mainly unmanufactured	217,600	254,713	(+) 37,113
Articles wholly or mainly manufactured	188,466	217,408	(+) 28,942
Other articles	4,064	5,248	(+) 1,184
Total Imports ...	769,949	863,944	(+) 93,995
Exports, f.o.b.—			
United Kingdom Produce and Manufactures—			
Food, drink and tobacco	32,309	36,438	(+) 4,129
Raw materials and articles mainly unmanufactured	52,169	53,109	(+) 940
Articles wholly or mainly manufactured	328,746	346,330	(+) 17,584
Other articles	12,596	12,934	(+) 338
Imported Merchandise—			
Food, drink and tobacco	12,327	11,649	(–) 678
Raw materials and articles mainly unmanufactured	29,422	34,866	(+) 5,444
Articles wholly or mainly manufactured	13,849	15,632	(+) 1,783
Other articles	230	332	(+) 102
Total Exports ...	481,648	511,290	(+) 29,642
Bullion and Specie—			
Imports	281,503	355,666	(+) 74,163
Exports	197,134	129,542	(–) 67,592

Movements of Shipping in the Foreign Trade—	Number of Vessels.	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.
Entered with cargoes—						
British	24,387	36,517	24,238	37,867	(–) 149	(+)1,350
Foreign	25,008	28,027	26,139	29,519	(+)1,131	(+)1,492
Total entered ...	49,395	64,544	50,377	67,386	(+) 982	(+)2,842
Cleared with cargoes—						
British	29,528	34,468	29,292	34,226	(–) 236	(–) 242
Foreign	21,079	22,855	21,158	22,773	(+) 79	(–) 82
Total cleared ...	50,607	57,323	50,450	56,999	(–) 157	(–) 324

An estimate based on a special enquiry which has recently been made by the Ministry of Agriculture of the output of *crops grown under glass* in England and Wales shows that the glasshouse industry is making appreciable progress. The total area under glass in 1935 is estimated at 3,360 acres, as against 2,725 acres ten years earlier, and the total value of the crops sold is put at £6,965,000, as compared with £5,570,000 in 1931 and £4,830,000 in 1925. Fruit and vegetables accounted for 55 per cent. of the output in 1935, 36 per cent. being tomatoes, and the remainder cucumbers, grapes, salads, mushrooms, etc. Cut flowers and flowering plants formed 45 per cent. of the total, rather less than one-third being flowers from bulbs, the other principal flowers being chrysanthemums, carnations and roses. The output of cut flowers, etc., appears to be increasing rather more rapidly than fruit and vegetables. These figures are, of course, exclusive of flowers grown in the open. The number of workers regularly employed in the glasshouse industry is estimated at 27,000 together with 8,800 casually employed, but on some holdings some workers may be employed part of their time on other agricultural operations.

The advance in general *wholesale prices* which characterized nearly the whole of 1936 continued during January and February, 1937, although there was some temporary recession in certain food prices in February. The Board of Trade index number of general wholesale prices (1930 = 100) rose from 100·8 in December, 1936, to 103·9 in February, 1937, or about 3·1 per cent. Food prices fell slightly (0·7 per cent.), but those of industrial materials and manufactures rose 4·9 per cent. As between December, 1936, and February, 1937, there was a decline only in the index numbers for foods other than cereals. The price of cereals advanced 3 per cent., coal 5·8 per cent., cotton 5·4 per cent., wool 4 per cent. and non-ferrous metals 13·6 per cent. The group of basic materials had advanced 10 per cent. The most pronounced rises in price were among non-ferrous metals, copper having advanced 26 per cent. in February above the average for December, 1936, and zinc 38 per cent. The price of tin which was about £209 per ton in February, 1936, had risen to over £300 by the beginning of March, 1937. As compared with the early months of 1936 there were marked advances in other groups. Cereals advanced 33 per cent., cotton 18 per cent., wool 25 per cent., miscellaneous materials 18 per cent., and basic materials 26 per cent. As compared with February, 1936, cocoa had advanced over 70 per cent. in price, wood-pulp of various qualities for paper-making between 40 and 50 per cent., and rubber 44 per cent. There seems to be every prospect of a continuance of the general rise in prices for some months at least.

The Board of Trade index numbers for the last three months are given below:

AVERAGES FOR 1930 = 100.

Date.	Total Food.	Total not Food.	All Articles.	Basic Materials.	Intermediate Products.	Manufactured Articles.	Building Materials.
Dec., 1936	99·3	101·6	100·8	110·0	100·4	100·9	100·3
Jan., 1937	99·4	104·6	102·9	116·8	103·3	102·2	101·1
Feb., "	98·6	106·6	103·9	121·2	104·3	103·2	101·2
Feb., 1936	*88·1*	*93·6*	*91·7*	*96·3*	*90·1*	*96·1*	*94·9*
" 1935	*86·6*	*88·8*	*88·0*	*84·9*	*86·6*	*94·3*	*92·2*

The figures for certain of the other British index numbers of wholesale prices and the official index numbers for Germany, France and the United States are given below for comparison.

Date.	Board of Trade (1930 = 100).	*Economist.* (1927 = 100)	*Statist* (1867–77 = 100)	*The Times.* (1913 = 100)	France (*Stat Générale*). (July, 1914 = 100)	Germany (*Stat. Reichsamt.*) (1913 = 100)	United States (Bureau of Labor).
Dec., 1936	100·8	79·3	—	120·8	496	104·4	84·1
Jan., 1937	102·9	81·0	—	122·8	513	105·3	85·4
Feb., 1937	103·9	82·3	—	124·0	517	105·5	86·0

There was no appreciable change in the general level of *retail prices* during the first two months of 1937, slight seasonal reductions in the prices of certain articles of dairy produce being counterbalanced by slight advances elsewhere. The Ministry of Labour's index number of prices of articles of working-class consumption (prices at July, 1914 = 100) remained at the same figure (151) as at the commencement of the year, and the number for food articles only declined from 136 at January 1st, 1937, to 135 at March 1st. Compared with the beginning of March, 1936, there has been an advance of 3·3 per cent. in general prices and of 4·7 per cent. in food prices. Compared with two years ago general retail prices have advanced 7 per cent.

The Ministry of Labour index number for recent months is given below (prices at July, 1914 = 100).

	Jan. 1st, 1937.	Feb. 1st, 1937.	March 1st, 1937.	March 1st, 1936.	March 1st, 1935.
Food Prices	136	135	135	129	122
All Articles (food, clothing, rent, fuel, etc.)	151	151	151	146	141
All Items (a year earlier)	147	147	146	141	140

Employment continued to improve, and at the end of February, 1937, was on the whole slightly better than in December, 1936. The seasonal decline in January was considerably less severe than is usual, and the number on the registers of the Employment exchanges in Great Britain showed an increase of 60,500 only. During the previous five years the seasonal increase in January averaged nearly 220,000, and the improvement in February was not sufficient to counterbalance the increase. In February, 1937, however, the numbers on the registers had declined to a figure very slightly lower than in December, 1936. The average rate of unemployment in the insured trades in Great Britain and Northern Ireland at the end of February, 1937, was 12·2 per cent., compared with 12·6 per cent. in January, 1937, 12·2 per cent. in December, 1936, and 15·3 per cent. in February, 1936. It was lower than in any February since 1929, when it was 12·1 per cent. Unemployment was least in London (7·3 per cent.) and in the Midlands (7·6 per cent.) and highest in the Northern Division (20·3 per cent.), in Northern Ireland (25·1 per cent.) and in Wales (26·0 per cent.). In Scotland it was 17·6 per cent. As compared with both February, 1935 and 1936, employment in February, 1937, showed an improvement in all of the 102 industries into which the Ministry of Labour group workers in the insured trades, with the exception of fishing and the manufacture of artificial silk yarn. In eight industries covering nearly 1,100,000 workpeople the rate of unemployment remains still over 20 per cent., and in twenty-two industries covering rather more than three and a quarter millions of workpeople, the rate of unemployment has not yet fallen below 15 per cent. This latter group includes coal-mining and the building trades, employing nearly two millions, where the percentages unemployed at the end of February, 1937, were 15·3 per cent. and 16·4 per cent. respectively.

The number of workpeople (insured and uninsured) on the registers of the employment exchanges and offices of the Ministry of Labour in Great Britain are given below for the last three months:

Date.		Wholly Unemployed.	Temporarily Stopped.	Persons Normally in Casual Employment.	Total.
Dec. 14th, 1936	...	1,365,035	194,841	68,843	1,628,719
Jan. 25th, 1937	...	1,433,957	183,668	71,598	1,689,223
Feb. 22nd, 1937	...	1,391,932	161,834	74,079	1,627,845
Feb. 24th, 1936	...	*1,677,077*	*259,292*	*88,652*	*2,025,021*

The above figures include juveniles aged 14 and 15 and agricultural workers who became insurable on May 4th, 1936. The number of juveniles aged 14 to 15 was 17,101. The number of agricultural workers was 30,994, of whom 18,251 had claims admitted for benefit, and the remainder consisted of those who had claims for agricultural benefit under consideration and those who had claimed benefit under the general scheme by virtue of contributions paid during periods of employment in industries other than agriculture.

The Ministry of Labour has begun the publication in the *Ministry of Labour Gazette* of the results of an inquiry into the average weekly *earnings and hours of labour* of workpeople employed in manufacturing industries generally, and in the principal non-manufacturing industries for the week ended October 12th, 1935. In the issues for February and March, 1937, particulars of the average earnings and hours in the selected week are given for rather more than a hundred different trades or branches of trade in seven large groups of industries. Earnings and hours are shown separately for men, boys, women and girls. The results for the seven groups are given below:

Industrial Group.	Nos. of Workpeople Covered by Returns.	Average Weekly Earnings of										Average hours Worked by all Workpeople.
		Men (21 years and over).		Youths and Boys (under 21 years).		Women (18 years and over).		Girls (under 18 years).		All Workpeople Covered by Returns.		
		s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	
Textile Industries	923,674	55	11	23	1	30	3	17	2	36	1	47·7
Clothing „	471,100	64	6	22	5	32	8	15	0	35	0	45·4
Treatment of Mine and Quarry Products (Non-Metalliferous)	50,925	60	8	28	3	29	1	17	3	56	8	49·6
Brick, Pottery, Glass, Chemicals, etc. ...	318,356	63	0	24	5	29	5	15	4	48	2	48·0
Leather Industries	41,551	61	9	22	9	29	6	15	4	44	9	48·8
Food, Drink, and Tobacco ...	363,119	63	8	24	11	32	1	17	0	44	10	48·5
Paper, Printing, Stationery, etc.	292,649	83	8	22	11	33	5	15	6	55	5	48·6

The total number of workpeople covered by the returns was 2,461,374, and the information received in regard to 74 per cent. of the workpeople was in sufficient detail to furnish particulars of the wages by sex and age.

Population.—According to the latest figures published by the Registrar-General, the total population of England and Wales is estimated to have amounted to 40,839,000 persons as at the middle of the year 1936. The figure is some 887 thousands in excess of the number enumerated at the Census of 1931, and thus indicates an average rate of growth over the five post-censal years of 0·43 per cent. per annum following an average for the ten preceding intercensal years of 0·55 per cent. per annum. Of the total increase of 887 thousands, 600 thousands is to be accounted for by the excess of births over deaths, leaving 287 thousands to be ascribed to the miscellaneous movements summed up in the term migration; the latter has been inward on balance since about 1930, after having been almost consistently outward in character over a period of several decades.

Natural increase, *i.e.*, the excess of births over deaths, accounted for an increase of population of 110 thousands in the year 1936. Owing to a somewhat heavy incidence of deaths in the early part of the year, the figure is rather lower than that of last year, but compared generally with the numbers recorded since the last census, viz., 130, 84, 121 and 122 thousands in the years 1932–35 respectively, the level is sufficiently high and persistent to suggest that the population may be expected to continue to increase, though at a diminishing rate, for a decade or more, a period which may even be extended if the present inward migration tendency continues to supplement the natural increase.

Marriages, England and Wales.—The marriages provisionally announced for 1936 number 353,561 or a rate, in terms of persons married, of 17·3 per 1,000 population. The rate is in excess of the high rate of last year (17·2), and excluding the somewhat violent fluctuations associated with the period of the war, is higher than any recorded since 1873.

It is of interest to observe that over the twelve years 1922–33 the annual rate was maintained at a more or less constant level of between 15 and 16 per thousand, corresponding broadly with the position in the pre-war years of the present century; since 1933, however, continued increases have been recorded, viz., 16·9, 17·2 and 17·3 in the respective years 1934–36, and even when allowance is made for the differing age incidence in the population, it is necessary to go back to the period 1871–80 to find a parallel to the present frequencies. The recent increase will probably be associated with the improvement in economic conditions, and it is no doubt partly responsible for the check to the long-continued fall in the birth rate which dates from about the same time.

Births, England and Wales.—Live births registered during 1936 numbered 605,292, corresponding to a rate of 14·8 per thousand population. The number is nearly 7,000 in excess of those of last year, while the rate is 0·1 per thousand higher.

The minimum birth rate touched in this country was that of 14·4 per 1,000 recorded in 1933, and this marked the lowest hitherto recorded point in the decline which, apart from the war years, had been more or less continuous from the peak position of 36·3 per 1,000 registered in 1876. The excess of the current rate over the minimum is not a large one, and it would ordinarily be disregarded as within the margin of casual variation associated with this type of record. The significance which may attach to it at the present time lies in the fact that for four years in succession the rate has been more or less stationary; it is too early yet to say whether this is more than a temporary halt in the downward movement, but it is the first experience of its type to be recorded during the whole of the long decline, and since from the latest returns it appears to be continuing into the current year, it may well give pause to those who foresee a rapid and early decline in the population of the country. The rate of reproduction represented by the present birth-rate level is, of course, wholly insufficient to maintain a stationary population in the indefinite future; at the same time, its present inadequacy in this respect is hardly sufficient in itself to lead to the expectation of a population materially below the present 40 million level for a considerable period which may be as much as 40 years or thereabouts from the present time.

The sex incidence of the births of 1936 is represented by the proportion of 1,054 males per 1,000 females, which compares with 1,056 last year and 1,051 in the five years 1931–35.

Deaths, England and Wales.—The deaths registered in 1936 numbered 495,798, corresponding to a crude death rate of 12·1 per thousand population. The number is 18,397 greater than that of last year—the whole of the excess being located in the first quarter of the year—while the rate is higher by 0·4 per 1,000 population. The current rate of 12·1 may be compared with 11·4, the minimum recorded for this country in 1930, and with 12·0 the average for the five years 1931–35.

The infant mortality rate was low at 59 per 1,000 live births, but was 2 above the minimum reported in the previous year; it may be compared with 62, the average of the 5 years 1931–35, and 72 the average of the preceding 10 years 1921–30.

The latest available age rates are those for the year 1935 recently published in Part I of the Registrar-General's *Statistical Review* for that year, and are as follows, comparative figures being added for the quinquennium 1931–35:—Annual Deaths per 1,000 population in each age group.

Age. (last birthday)	1935.		1931/35.	
	Males.	Females.	Males.	Females.
0–4	17·9	14·2	20·1	16·0
5–9	2·1	1·9	2·3	2·1
10–14	1·3	1·3	1·4	1·4
15–19	2·1	2·0	2·4	2·2
20–24	2·9	2·6	3·2	2·8
25–34	3·1	2·9	3·3	3·1
35–44	5·0	4·0	5·4	4·3
45–54	10·8	7·4	11·2	7·9
55–64	23·2	16·2	23·5	16·9
65–74	53·5	41·5	56·8	43·0
75–84	131·8	104·9	135·2	109·7
85 and over	269·2	239·3	278·8	247·6
All ages Standardized * ...	10·2	8·0	10·7	8·6

* On basis of 1901 population of England and Wales.

An interesting feature which appears in the recently published Text Volume of the Registrar-General's *Annual Statistical Review* for 1934 is a study which compares the mortality experience in each county borough and administrative county during 1931–34 with that of ten or twenty years before. In 1911–14 the standardized mortality in the 83 towns now classed as county boroughs ranged from 74 to 150 per cent. of the national mortality, but by 1921–24 the range had contracted to 83–140 and by 1931–34 to 87–137. This narrowing of the range must, it is suggested, be attributed in the main to the effects of public hygiene and amelioration of the conditions of life in the towns where mortality was worst in 1911–14. Whilst 54 towns had rates of 14 per 1,000 or more twenty years previously, not one gave an average rate as high as 14 in 1931–34, and 31 gave rates below 10, contrasted with only one in 1911–14. In spite of the exceptional industrial depression of recent years, the improvement in the chances of survival has been much greater in the less favourably circumstanced towns during the twenty years than in the more happily situated group, for the 8 towns with highest mortality in 1911–14 register a 33 per cent. fall (from an average standardized rate of 19·2 to 12·9), whilst the 8 towns with lowest rates in 1911–14 show a 19 per cent. fall (from 10·9 to 8·8 per 1,000). The contrast between the town and county mortalities has diminished in the last twenty years, and the decline for the administrative counties has ranged from 29 to 12 per cent.

The standardized mortality in each county borough during 1929–33 is also correlated with three measures of environment and social conditions—namely, the zone of geographical latitude in which the town is situated, a housing density index given by the mean number of persons per room, and a social index given by the proportion of males over 14 years of age whose occupation places them in the unskilled or partly skilled classes. The resulting coefficients with mortality are each fairly high, being of the order 0·7, and for none of the factors does the correlation disappear when the effect of the other two has been eliminated. When groups of towns of similar geographical position and similar average social classification based upon occupations are compared, there still remains an association between the housing density in the town and its standardized death rate, represented by a correlation coefficient of 0·5. No such association is evident between the social distribution of the population and mortality in the counties as is found in the large towns, and it is evident that this absence of association may be due in part to the low rate amongst agricultural labourers. The correlation between a social classification based on occupations and mortality would seem to be a phenomenon characteristic of town-dwellers, and not to be explained simply by differences in income levels.

2. OTHER STATISTICS.

There has been a considerable decline in the value of *Stock Exchange Securities* carrying fixed interest since the end of 1936. Up to February 17th, 1937, the index number of securities prepared by the *Bankers' Magazine* showed a decline in values during the preceding two months of 4·3 per cent. in fixed interest securities. The fall was almost entirely in British Government and Corporation Stocks and in British Railway Preference and Debenture Stocks. The index number (December, 1921 = 100) declined from 130·9 in December, 1936, to 129·7 in January and 125·5 in February, 1937. On the other hand, there was on balance an increase in the value of Variable Interest Securities during the two months, the index number rising from 137·7 in December to 138·7 in January and receding slightly to 138·2 in February, 1937. As a consequence the general index number for all classes of securities only showed a decline of rather over 2½ per cent. (from 133·1 to 129·7). During February, 1937, however, there was an appreciable falling off in the value of British Railway Ordinary Stocks, but, on the other hand, a continued appreciation in what are generally regarded as more or less speculative shares.

The high level of *shipping freights* that obtained during the last three months of 1936 continued during January and February, 1937, with some advance in January which was not fully maintained in the following month. During the first half of March, however, there was some further advance and time-chartering has been much more prevalent of late and at increased rates. The index number (1920 = 100) of the Chamber of Shipping rose from 31·71 in December, 1936, to 32·64 in January and declined slightly to 32·56 in February, 1937. Compared with February, 1936, when the index number was 19·66 there was an increase of nearly 66 per cent. As compared with the average rates for 1929 there has been an increase during the three months December, 1936, to February, 1937, of about 30 per cent. It is stated that there is now a very small amount of idle tonnage.

The last issued statistics of *retail trade* prepared by the Bank of England in conjunction with various retail distributors' associations relate to the trade year February, 1936, to January, 1937, and show the total retail sales for that period as 5·9 per cent. in excess of those for the previous twelve months. Sales of food and perishables increased 7·5 per cent. and other merchandise 4·2 per cent. For the month of January, 1937, total sales were 2·4 per cent. above those for January, 1936, and the index number for the former month (average daily sales in 1933 = 100) stood at 119 or higher than in any January in the period 1932–36.

A satisfactory statement of the sources from which the different countries of the world secure their supplies of raw materials cannot be built up from the export records of the producing countries. At the time and place of despatch from those countries, the information available regarding their ultimate destinations is often very imperfect. Shortly after the Centenary Meeting of our Society, arrangements were completed for inviting the importing countries to furnish particulars of the countries of production of their imports of certain selected foodstuffs and raw materials, even though their ordinary import records were not based on a classification by origins. The selected items included twenty natural products, and to these were added wheat flour, coconut oil, hewn or sawn softwood, wood pulp, motor spirit and iron and steel (separate figures for crude metal, and for metal simply cast, rolled or forged being requested). Neither lumber, crude petroleum nor iron ore was included in the list of twenty, hence the later items of this list. Further, a separation was also requested of shelled from unshelled ground-nuts, of rice husked, cleaned, or polished from rice in the husk, of refined from unrefined sugar, and also of refined from unrefined coconut oil and copper, of scoured from greasy wool and of mechanical from chemical pulp. The desired separation was found to have been only partly feasible in the case of the last five of these, on the basis of existing knowledge.

The League of Nations has recently published, under the title "International Trade in Certain Raw Materials and Foodstuffs by Countries of Origin and Consumption," a summary of the data collected in respect of 1935, the first year of this interesting experiment. The tables distinguish 49 countries of origin and, in addition, eleven composite groups within which, for particular commodities, some additional single countries are specified. The figures relate to imports into 42 countries, whose total trade accounted for five-sixths of the world's international trade in 1935. In the case of some, at least, of the selected items forming the special subject of enquiry, the aggregate imports recorded formed a notably larger share than five-sixths of the total world movement from country to country.

For 35 of the 42 importing countries, the information used related specifically to countries of origin. In the case of 11 of these 35, the ordinary published statistics of import trade were utilized, in the absence of specially prepared particulars. As a result, the geographical areas for which separate figures were available in these 11 cases were not necessarily identical in extent with those that had been specified in the scheme for comparable statistics. In the case of two countries, particulars showing countries of origin were available for a small number only of the items in the selected list. For the remaining 5 importing countries, the particulars used were those of countries whence the goods were consigned (or shipped) to the importing countries. Even though these may frequently be identical with the countries in which the goods were produced, the absence of assurance on that head diminishes the value of such data. For the United Kingdom, arrangements to secure particulars of the countries of origin, where these differ from the countries of consignment, were not in operation during the year 1935, and particulars of retained imports, classed by countries whence consigned, were utilized in cases in which that course appeared justified. For the United States, particulars of countries of origin were available only in the cases of raw wool and raw cotton imported in 1935. For British India, the Dutch East Indies and Greece, the particulars of countries of consignment shown in the published accounts of trade were utilized, as an alternative to the omission of these countries from the lists of importing countries shown in the tables.

For 1936, and for any later years in respect of which the compilation of records corresponding to that attempted for 1935 may be continued, it may be hoped that more fully comparable data will have been made available. In carrying out modern trade policies, the knowledge of the countries in which imports originate has had an increasing degree of importance, and it is not unreasonable to expect that more reliable comparisons may be possible in future years than those for 1935. In spite of the deficiencies in the compilation for that year, the figures contain much that is of interest to the users of statistics of trade, and may be considered to have justified fully the decision to compile them.

The population of the future is a problem of which the governments of most European countries are now acutely conscious, and much investigation, official and unofficial, is being carried out. One such study of fertility has been issued by the Central Bureau of Statistics of the Netherlands (Population Statistics, Communication No. 2, January, 1937). The report shows that the birth rate of that country has declined from 36·4 per 1,000 inhabitants in 1875 to 20·2 in 1935 and the fertility rate (legitimate births per 1,000 married women under 50 years of age) from a peak of 306 in 1870–79 to 155 in 1931–35, although the proportion of married women younger than 35 years has slightly increased. In 1935, for the first time, it became possible to classify the births according to the age of the mothers, and from these data it is calculated that the gross reproduction rate in that year was 1·262 and the net reproduction rate 1·102. Thus at present the Netherlands, unlike most other countries of Western and Northern Europe, is still rather more than maintaining its population—in the sense that the number of women aged 15–49 is being more than replaced at the present fertility rates.

CURRENT NOTE.

The Agricultural Economics Society has decided to offer two annual prizes of £10 and £5 respectively for essays on subjects connected with the economics of agriculture. Competitors must be either students at recognized institutions or holders (of not more than two years' standing) of degrees and/or diplomas in agriculture and/or economics. Essays for the current year must be sent in by March 31st, 1938, and must be on one of the following subjects:—

(*a*) Social and economic changes in the position of farm workers during the last twenty years.
(*b*) Sub-marginal land in Great Britain.
(*c*) The nature and extent of changes in farm organisation and technique since the War.
(*d*) The influence of a more adequate and well-balanced dietary for all classes upon the character of British Agricultural Output.
(*e*) Agricultural Tariffs and Quotas in Europe since 1924—Their Growth and Objects.
(*f*) Britain's Security in time of war depends on Home-Production rather than on importation of food supplies.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Accountant's Magazine, January, 1937—A plea for a universal currency: *J. T. Nicoll.*

Auctioneers' and Estate Agents' Institute Journal, March, 1937—Land utilisation survey of Britain (with 5 illustrations and discussion): *L. Dudley Stamp.*

Economica, February, 1937—An analysis of unemployment, II: *Sir W. Beveridge.* The working of the pre-war gold standard: *P. B. Whale.* Economics and knowledge: *F. A. von Hayek.* The pig-cycle in Great Britain: an explanation: *R. H. Coase* and *R. F. Fowler.* A note on the supply price of enterprise: *K. S. Isles.*

Economic History, February, 1937—Statistics of corn yields in medieval England: *R. Lennard.* The pottery industry and the industrial revolution: *J. Thomas.* Prices and wages in Southern France under John Law's system: *Prof. E. J. Hamilton.*

Economic Journal—

December, 1936—Herbert Somerton Foxwell: *J. M. Keynes.* Plantation economy: *C. R. Fay.* British overseas investments in 1934 and 1935: *Sir R. Kindersley.* Road competition and the regulation of railways: *Gilbert Walker.* Economic calculus in a planned economy: *E. F. M. Durbin.*

March, 1937—The relation between economic theory and economic policy: *C. Sutton.* Some notes on the Stockholm theory of savings and investment, I: *Bertil Ohlin.* Recent trends in the Lancashire cotton industry: *Christopher Saunders.* Earnings of workers in large industrial establishments in British India: *V. K. R. V. Rao.*

Eugenics Review, January, 1937—Falling population and positive eugenics: *B. S. Bramwell.* The inheritance of mental disorder: *Eliot Slater.*

Geographical Journal—

February, 1937—Land utilization in England at the end of the eighteenth century: *Gordon East.*

March, 1937—Climatic cycles: *Prof. D. Brunt.*

April, 1937—The population of Bengal, its distribution and changes: a contribution to geographical method: *Arthur Geddes.*

UNITED KINGDOM—*Contd.*

Institute of Actuaries, Journal, November, 1936—Memoir of Sir Alfred W. Watson. Some observations on "family annuities" considered with reference to national statistics: *G. H. Maddex.* Some points that have arisen out of the continuous investigation into the mortality of assured lives 1924–1929: *W. Palin Elderton, H. J. P. Oakley,* and *H. B. Smither.*

Lloyds Bank Ltd. Monthly Review, April, 1937—The economic and financial position in France: *Frédéric Jenny.*

Midland Bank Monthly Review—

January–February, 1937—The risks of boom conditions and the means of protection: *Rt. Hon. R. McKenna.*

February–March, 1937—Quarterly graphical survey No. XXXII. The meaning of the "fall in gilt-edged." Exchange stabilisation funds compared and contrasted.

March–April, 1937—The trend of balances of payments. Stages in international recovery.

Ministry of Agriculture, Journal, March, 1937—The agricultural produce index number for 1936.

Public Administration, January, 1937—Some aspects of sick absence in industry: *H. H. Bashford.*

Royal Society of Arts Journal, April, 1937—Working-class insurance: *Sir Arnold Wilson.*

Sociological Review, January, 1937—A survey of mental ability in a rural community: *M. V. Matthews, D. A. Newlyn* and *L. S. Penrose.* Variability of the sex-ratio of criminality: *L. Radzinowicz.*

INDIA—

Sankhyā, Indian Journal of Statistics, Part 4, 1936—Karl Pearson, 1857–1930: *P. C. Mahalanobis.* A note on the distribution of differences in mean values of two samples drawn from two multivariate normally distributed populations and the definition of the D^2-statistic: *R. C. Bose.* On the complete moment-coefficients of the D^2-statistic: *S. N. Bose.* Cotton prices in relation to quality and yield: two notes by *R. S. Koshal* and *D. F. Kapadia* respectively.

Indian Journal of Economics, January, 1937—The relations between human and bovine population pressure in India: *R. K. Mukerji.* Professor Hayek's neutral money doctrine: *B. P. Adarkar.*

AUSTRALIA—

Economic Record, December, 1936—Marketing and the constitution: *K. H. Bailey* and *L. F. Giblin.* The future of the Australian population: *S. H. Wolstenholme.* Excess costs of protected production. Estimates for two states: *S. E. Solomon* and *D. C. L. Smith.* National income of New Zealand: *F. B. Stephens.*

UNITED STATES—

American Academy of Political and Social Science, Annals—

January, 1937—Improved personnel in government service. Spoils and democracy; the development of a professional public service; new techniques of public personnel administration; the reform movement. [Whole number, including a supplement: Problems of the international distribution of population and raw materials, by *C. Gini*.]

March, 1937—Current developments in housing. A discussion designed to contribute to a better understanding of the factors involved in achieving adequate housing for all economic groups. [Whole number.]

American Economic Review, March, 1937—The economist in a world in transition: *Alvin Johnson*. Surplus labor and social wage in Great Britain: *Witt Bowden*. Are time deposits money? *Lin Lin*. The chain store in U.S. and Canada: *C. F. Phillips*.

—— *Supplement*—Economic interdependence, present and future: *Marcus Nadler*. Quantitative and qualitative changes in international trade during the depression: *A. M. Fox*. Current tendencies in commercial policy: *A. Feiler*. The trade problem of the Pacific: *Vernon A. Mund*. The situation of gold to-day in relation to world currencies: *Alvin H. Hansen*. Mechanisms and objectives of exchange control: *Bertil Ohlin*. The adequacy of existing currency mechanisms under varying circumstances: *J. H. Williams*.

American Philosophical Society, Proceedings, No. 6, 1936—Growth during adult life: *Aleš Hrdlička*.

American Statistical Association, Journal, March, 1937—Statistical requirements of the Social Security Board: *A. J. Altmeyer*. Analyzing families by composition type with respect to consumption: *Day Monroe*. Methods of measuring variations in family expenditures: *Faith M. Williams*. Measurement of effects of reciprocal trade agreements: *E. Dana Durand*. Statistical methods in balance-of-payments estimates: *Amos E. Taylor*. Statistical cost curves: *Joel P. Dean*. Methods used in strike statistics: *Florence Peterson*. Effect of allocation of non-resident deaths on death rates: *F. E. Linder*.

Econometrica, January, 1937—Income in theory and income taxation in practice: *Irving Fisher*. Methods of eliminating the influence of several groups of factors: *C. Gini*. Mr. Keynes and traditional theory: *R. F. Harrod*.

Harvard Business Review, Winter No. 1937—Changing conditions in world capital markets: *Leo Grebler*. Quantitative market analysis: scope and uses: *Lyndon O. Brown*.

Journal of Political Economy, February, 1937—Studies in the supply curve of labor: the relation in 1929 between average earnings in American cities and the proportions seeking employment: *Erika H. Schoenberg* and *Paul H. Douglas*.

UNITED STATES—*Contd.*

Milbank Memorial Fund Quarterly, January, 1937—Health indices: *K. Stouman* and *I. S. Falk.* Trends in annual birth rates among married women in selected areas according to nativity, age, and social class: *C. V. Kiser.* Urban differential fertility during the depression: *H. C. Griffin* and *G. St. J. Perrott.*

Monthly Labor Review—

November, 1936—The prison-labor problem: *Gustav Peck.*

February, 1937—Unemployed youth in New York: *E. N. Matthews.*

Quarterly Journal of Economics, February, 1937—The general theory of employment: *J. M. Keynes.* The components of the circular velocity of money: *James W. Angell.* Anticipations, business planning, and the cycle: *A. G. Hart.* On measurement of relative national standards of living: *M. K. Bennett.* Flexibility of demand in international trade theory: *C. P. Kindleberger.*

Review of Economic Statistics, February, 1937—The period 1919–1936 in the United States: its significance for business-cycle theory: *Sumner H. Slichter.* The Pareto Law: *Norris O. Johnson.* A selected bibliography of the literature on economic fluctuations, 1930–36: *R. A. Gordon.*

Wheat Studies of the Food Research Institute, December, 1936—The world wheat situation, 1935–36.

BELGIUM—

Revue du Travail, Janvier, 1937—Rapport annuel du service médical du travail (16e année, 1935).

CHINA—

Nankai Social and Economic Quarterly, January, 1937—Manchurian trade and tribute in the Ming dynasty; a study of Chinese theories and methods of control over border peoples: *T. C. Lin.* Industrial organization in China: *H. D. Fong.*

DENMARK—

Nationaløkonomisk Tidsskrift—

Hefte 6, 1936—Harald Westergaard: *Hans Cl. Nybølle, Axel Nielsen, Jens Toftegaard.* Den Kommunale Beskatning: *V. Buhl.*

Hefte 1, 1937—Økonomiske og sociale problemer i U.S.A.: *H. Winding Pedersen.* Direkte og indirekte Skatter: *Jørgen Pedersen.*

FRANCE—

Journal des Économistes—

Novembre–Decembre, 1936—Le problème financier (1930–1936) : *M. Marion*. L'industrie métallurgique de transformation polonaise : *C. de Kownacki*.

Janvier–Février, 1937—La Banque de France en 1936 : *E. Rouland*. La Hollande et sa monnaie : *Bertrand de Castéja*. Le développement de l'industrie textile polonaise : *C. de Kownacki*.

Journal de la Société de Statistique de Paris—

Novembre, 1936—Chronique de démographie : *Henri Bunle*. La statistique au Service de la Santé Publique : *M. Moine*.

Janvier, 1937—Les récentes tendances démographiques dans le monde : *Pierre Depoid*.

Février, 1937—Les principes de la statistique mathématique, 3e partie : *R. Risser*.

Mars, 1937—Le prix du kilogramme de pain à Paris de 1880 à 1936 : *Pierre Proust*.

Revue d'Économie Politique, *Janvier-Février*, 1937—La stabilisation monétaire : est-elle souhaitable ? est-elle possible ? *Laurent Dechesne*. Une économie politique sans doctrines (étude comparée du capitalisme et du bolchevisme : *Jean Lescure*. Distribution des revenus et équilibre économique : *R. Marjolin*.

GERMANY—

Allgemeines Statistisches Archiv, *Heft* 4, 1937—Nochmals : die Arbeitslosenstatistik : *W. Hemmer*. Weitere Fortschritte auf dem Forschungsgebiet der internationalen Kriminalstatistik : *E. Roesner*. Die russische Volkszählung vom 6 Januar 1937 : *A. Owtschinnikow*. Die Gesetze der grossen Zahlen und das Gesetz der seltenen Ereignisse : *W. Lorey*.

Archiv für mathematische Wirtschafts- und Sozialforschung, *Heft* 1, 1937—Einige Grundfragen der mathematischen Konjunkturtheorie (I) : *J. Tinbergen*. Gruppenversicherung gegen Durchschnittsprämie : *Klemens Löer*. Zum Problem des Realeinkommens : *Jan Wiśniewski*. Die Konzentrationskurven in der angewandten Statistik : *Hans Kellerer*.

Blätter für Versicherungs-Mathematik und verwandte Gebiete, *Januar*, 1937—Invalidität und Sterblichkeit : *H. Klingler*.

Vierteljahrshefte zur Konjunkturforschung, *Heft* 4, *Teil A*, 1937—Die Lage der Weltwirtschaft. Die Wirtschaftslage in Deutschland.

Weltwirtschaftliches Archiv, *März*, 1937—Entwicklung, Stand und Aussichten der Industrialisierung Chinas. [Whole number, including Chinas "Industriewirtschaft im Aufbau," by *H. H. K'ung*.]

ITALY—

Le Assicurazioni Sociali, Novembre–Dicembre, 1936—L'industria a domicilio e le assicurazioni sociali: *Prof. Federico Chessa.* Le migrazioni di operai nell' Impero: *S. Nannini.* [A Supplement contains these articles in French.]

Giornale degli Economisti e Rivista di Statistica

Dicembre, 1936—Risparmio forzato, cicli economici ed economia regolata: *F. Vito.* Media aritmetica, probabilità e frequenza: *P. Martinotti.*

Gennaio, 1937—Sui concetti di intensità e di quantità saldata applicati al movimento della popolazione: *S. Vianelli.* Lo sviluppo economico dell' Ungheria: *T. de Szádeczky-Kardoss.*

Febbraio, 1937—Tavola di fecondità della donna italiana secondo l'età ed il numero dei figli avuti: *M. de Vergottini.*

Giornale di Matematica Finanziaria—

N. 2, 1936—Sul valor effettivo di un' obbligazione: *E. Del Vecchio.* Betrachtungen über das durchschnittliche Risiko und über die absolute Gewinnhoffnung des Versicherten bei kontinuierlichen Versicherungen mit zwei verschiedenen Auflösungsmöglichkeiten: *H. Koeppler.*

N. 3, 1936—Betrachtungen über das durchschnittliche Risiko und über die absolute Gewinnhoffnung des Versicherten bei kontinuierlichen Versicherungen mit zwei verschiedenen Auflösungsmöglichkeiten (continuazione e fine): *H. Koeppler.*

Rivista di Storia Economica, Dicembre, 1936—L'atto di nascita del secondo impero britannico. Con una nota sul regime di concessione delle terre pubbliche: *Luigi Einaudi.* Intorno alla funzione della moneta immaginaria (con osservazioni di Luigi Einaudi): *Achille Loria.*

JAPAN—

Kyoto University Economic Review, December, 1936—The bankruptcy of wage theories; prolegomena to a power theory of economy: *Prof. Y. Takata.* Structure changes in Japan's foreign trade: *Prof. K. Taniguchi.*

POLAND—

Baltic and Scandinavian Countries, January, 1937—Poles in the United States of America: *J. S. Roucek.* Trade and shipping relations between Italy and the Baltic countries: *A. Giordano.* The shale-oil industry of Estonia: *A. Meits.*

SWEDEN—

Ekonomisk Tidskrift, Häft 4, 1936—Om ekonomiska prognoser: *Klas Böök.*

Skandinaviska Kreditaktiebolaget, April, 1937—The trend of the economic situation: *Prof. Gustav Cassel.*

SWITZERLAND—

Journal de Statistique et Revue Économique Suisse, Part IV, 1936—Die Abwertung und ihre wirtschaftlichen Folgen: *E. Schulthess.* Das Rohstoffproblem: *A. Grabowsky.* L'intervention de l'Etat dans le domaine des prix et son efficacité: *A. Masnata.*

INTERNATIONAL—

International Labour Review—

January, 1937—Industrial recovery in Japan: its causes and social effects: *Yoshio Kamii.* Handicrafts in Germany: *E. Schindler.*

February, 1937—The present status of economic planning: II. The problems involved: *P. W. Martin.* Economic and social development in Iraq: *A. M. Djamalzadeh.*

March, 1937—Agricultural planning and farm wages in New Zealand: *E. J. Riches.* Work creation policy in Germany, 1932–1935: 1: *Leo Grebler.* Immigration and settlement in Brazil, Argentina, and Uruguay: II. Factory inspection in Poland, 1928–1933.

Metron, Vol. XIII, No. 1—A general invariant criterion of fit for lines and planes where all variates are subject to error: *C. F. Roos.* Some geometrical considerations in the general theory of fitting lines and planes: *H. E. Jones.* Sugli indici relativi di variabilità e sulla concentrazione dei caratteri con segno: *V. Castellano.* The exponential frequency function and frequency distributions: *P. Ottestad.* The influence of restrictive routes upon the center of minimum aggregate travel: *D. E. Scates* and *L. M. van Nortwick.*

Revue de l'Institut International de Statistique, Livraison 4, 1936—India's national income [with French summary]: *G. Findlay Shirras.* La proportion des sexes dans les conceptions humaines [with English summary]: *M. Boldrini.* De la concordance et du coefficient de correlation [with English summary]: *G. Pietra.*

Social Research, February, 1937—Japan in world economics: *Emil Lederer.* Scarcity and abundance of capital as cause of crisis: *A. Kähler.* Totalitarian "elections" in Italy to-day: *G. Salvemini.*

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part I, 1937, the Society has received the publications enumerated below :—

1.—OFFICIAL PUBLICATIONS.

(a) United Kingdom and its several Divisions.

United Kingdom—

Agriculture, Department of, for Scotland. Cost of production of farm live stock and dairy produce. Reprint from *Scottish Journal of Agriculture* . . . 1918. Edinburgh: H.M.S.O., 1937. 8½″ × 5½″. 36 pp. 6*d.*

Air Ministry. Report of the Committee to consider the development of civil aviation in the United Kingdom, and the appendices thereto. London: H.M.S.O., 1937. 9¾″ × 6″. 51 + i pp. + 7 maps. 3*s.* 6*d.*

Dominions Office. Trade agreement between H.M. Government in the United Kingdom and H.M. Government in Canada . . . London: H.M.S.O., 1937. Cmd. 5382. 9¾″ × 6″. 50 pp. 9*d.*

General Register Office. Census of England and Wales, 1931. County of Leicester (Part II). London: H.M.S.O., 1937. 13¼″ × 8¼″. 23 pp. 1*s.* 3*d.*

Health, Ministry of—

Local Government Act 1929. Report on result of investigation under Section 110 (England and Wales). 9¾″ × 6″. 36 pp. 6*d.*

Town and country planning. Model clauses for use in preparation of schemes (with notes). 13¼″ × 8¼″. 125 pp. 2*s.*

Widows', Orphans' and Old Age Contributory Pensions (Voluntary Contributors) Bill 1937. Report by the Government Actuary on the financial provisions of the Bill. Cmd. 5415. 9¾″ × 6″. 17 pp. 3*d.*
[London: H.M.S.O., 1937.]

Health, Department of, for Scotland. Town and country planning in Scotland. Edinburgh: H.M.S.O., 1937, 9¾″ × 6″. 13 pp. 3*d.*

Home Office—

Departmental Committee on the Hours of Employment of Young Persons in Certain Unregulated Occupations, Report. Cmd. 5394. 50 pp. 9*d.*

Royal Commission on Local Government in the Tyneside Area, Report. Cmd. 5204. 104 pp. 1*s.* 6*d.*

Safety pamphlet no. 16. Weight lifting by industrial workers. 44 pp. 1*s.* 3*d.* [London: H.M.S.O., 1937. 9¾″ × 6″.]

Imperial Economic Committee. 30th report. Survey of the trade in motor vehicles. London: H.M.S.O., 1936. 9¾″ × 6″. vi + 170 pp. 2*s.* 6*d.*

Industrial Health Research Board. Reports: 77. Fatigue and boredom in repetitive work. By *S. Wyatt* and *J. N. Langdon.* 77 pp. 1*s.* 3*d.*—78. A Borstal experiment in vocational guidance. By *Alec Rodger.* 50 pp. 9*d.* [London: H.M.S.O., 1937. 9¾″ × 6″.]

Medical Research Council. Special report series: 219. Reports of the Committee on the Physiology of Hearing, IV. The use of hearing aids. By *A. W. G. Ewing, I. R. Ewing* and *T. S. Littler.* 40 pp. 9*d.*—221. Reports of the Hearing Committee, V. Hearing and speech in deaf children. By *M. T. Kerridge.* 137 pp. 2*s.*
[London: H.M.S.O., 1937. 9¾″ × 6″.]

Overseas Trade, Department of. Reports: 660. Brazil, Sept. 1936. 170 pp. 3*s.* 661. Turkey, 1936. 41 pp. 9*d.* 662. Paraguay, Nov. 1936. 47 pp. 1*s.* 663. United States of America, Dec. 1936. 205 pp. 3*s.* 664. French West Africa. 67 pp. 1*s.* 3*d.* 665. Persian Gulf, Dec. 1936. 16 pp. 4*d.* 666. Ecuador, 1936. 39 pp. 9*d.*
[London: H.M.S.O., 1937. 9¾″ × 6″. 7 parts.]

(a) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Trade, Board of. Import Duties Act Inquiry (1934). Part II. The iron and steel trades, the engineering and vehicle trades, the non-ferrous trades, the timber, paper, clay and building materials trades, and a general summary statement. London: H.M.S.O., 1937. 9¾″ × 6″. xii + 308 pp. 4*s.* 6*d.*

(b) Dominions, Colonies, and Protectorates.

Australia—

Seventh Australian Cancer Conference held at Melbourne . . . 1936, Report. Canberra, 1936. 13¼″ × 8¼″. 72 pp.

Canada—

Dominion Bureau of Statistics. Conference of British Commonwealth Statisticians—

Verbatim report of proceedings. Ottawa . . . 1935. 10¾″ × 8½″. 2 vols. (From Sir A. W. Flux.)

Report and resolutions adopted by the Second Conference of government officers engaged in dealing with statistics in the British Commonwealth of Nations. 9¾″ × 6″. 49 pp. [Ottawa, 1935.]

Union of South Africa—

Census and Statistics Office. Census 5th May, 1936. Preliminary report on the enumeration of all races of the population (figures revised to the 15th October, 1936). Pretoria, 1936. 12″ × 9¾″. 23 pp. 1*s.*

(c) Foreign Countries.

Brazil—

Banco do Brasil. Boletim estatistico. No. 9. Janeiro de 1937. Rio de Janeiro, 1937. 9½″ × 7″. 98 pp.

Directoria de Estatistica da Producão, Ministerio da Agricultura. Revista de economia e estatistica. Julho 1936. Ano I, No. 1. Rio de Janeiro, 1936. 10¾″ × 7″. 70 + 15 pp.

Czechoslovakia—

Office de Statistique. Recensement de la population de la République Tchécoslovaque effectué le 1er décembre 1930. Tome I. Prague, 1934. 12¼″ × 9″. 47 + 55 + 205 pp. 65 *Kč.*

Estonia—

Bureau Central de Statistique. Problèmes de la population. Résultats du recensement de I. II. 1934. Vol. IV. Tallinn, 1937. 10¼″ × 7½″. 156 pp.

Finland—

Finlands Officiella Statistik XXXII. Enquêtes spéciales sur les affaires sociales. Étude sur le coût de la vie en 1928. B. Les ménages des ouvriers agricoles. Helsingfors, 1937. 10½″ × 7¼″. 82 + 39 pp.

France—

Statistique Générale de la France. Résultats statistiques du recensement de la population, effectué le 8 mars 1931. Tome I. Partie 5. Étrangers et naturalisés. Paris, 1936. 10½″ × 8¼″. 355 pp.

(c) **Foreign Countries**—*Contd.*

Germany—

Institut für Konjunkturforschung. Sonderheft 43. Lebensversicherung und Allgemeine Wirtschaftstätigkeit. Berlin, 1937. 11¾″ × 8½″. 46 pp. *Rm.* 5.80.

Reichsgesundheitsamt. Arbeiten. Band 71. Heft 1. Gesammelte Gesundheitsstatistische. Abhandlungen und Kurzberichte. Folge I (1936). Berlin: J. Springer, 1936. 11″ × 8″. 159 pp.

Statistisches Reichsamt. Statistik des Deutschen Reichs, Band 497. Die Wahlen zum Reichstag am 29 März 1936. Berlin, 1937. 12″ × 8½″. 59 pp. 3 *Rm.*

Hungary—

Office Central Royal Hungrois de Statistique. Les conditions de la propriété foncière en Hongrie dans l'année 1935. I. Suivant les comitats et villes autonomies ainsi que par communes (villes). Budapest, 1936. 10½″ × 7½″. 99 + 1050 pp. 25 *P.*

Italy—

Istituto Centrale di Statistica. VIII censimento generale della popolazione 21 aprile 1936. Vol. II. Province. Fasc. 53, 64, 66, 67, 68, 75, 76, 78. Rome, 1937. 12″ × 9″. 8 parts. *L.* 4 *each.*

Netherlands—

Amsterdam. Bureau Municipal de Statistique. Enquête sur les conditions de vie de chômeurs assistés et de leurs ménages (Octobre 1934–février 1935). Amsterdam, 1937. 9½″ + 6¼″. vi + 244 pp. *F.* 3.25.

Norway—

Committee for Whaling Statistics. International whaling statistics VIII. Edited by the Committee . . . Oslo, 1937. 9½″ × 6¼″. 54 pp. *Kr.* 2.00.

Poland—

L'Office Central de Statistique. Deuxième recensement général de la population du 9 dec. 1931. Logements et ménages. Population. Professions. Ville de Wilno. Warsaw, 1937. 11½″ × 8″. xxx + 103 pp.

United States—

Agriculture, Department of—

Circulars: 413. An improved method of converting an observed skein strength of cotton yarn to the strength of a specified yarn count. 18 pp. 5 *c.* 414. Farmer bankruptcies, 1898–1935. 32 pp. 5*c.* 417. The farm real estate business, 1935–36. 40 pp.

Technical bulletins: 506. Identification, history, and distribution of common sorghum varieties. 101 pp. 25 *c.* 523. Transportation of apples from the Shenandoah–Cumberland section to overseas markets. 26 pp. 5 *c.* 532. The comparative moisture-absorbing and moisture-retaining capacities of peat and soil mixtures. 25 pp. 5 *c.* 535. Wheat requirements in Europe (especially pertaining to quality and type, and to milling and baking practices). 191 pp. 15 *c.* 539. Federal seed-loan financing, and its relation to agricultural rehabilitation and land use. 59 pp. 10 *c.*

Children's Bureau—

Publication nos.: 233. Infant mortality in Memphis. 103 pp. 15 *c.* 234. Industrial home work under the National Recovery Administration. 57 pp. 10 *c.*

(c) Foreign Countries—*Contd.*

Education, Office of—

Bulletins: 8. Graduate work in engineering in universities and colleges in the United States. 111 pp. 15 *c.* 10. Scholarships and fellowships available at institutions of higher education. 117 pp. 15 *c.* 11. A guide to curriculum adjustment for mentally retarded children. 133 pp. 20 *c.* 14. Poland's institutions of higher education. 160 pp. 25 *c.* 15. Authority of state executive agencies over higher education. 57 pp. 10 *c.* 17. William Torrey Harris; the commemoration of the 100th anniversary of his birth. 70 pp. 15 *c.* 18. VI. Community surveys. 97 pp. 15 *c.*

Federal Trade Commission. Report on the sale and distribution of milk and milk products. Twin city sales area. 71 pp. Boston, Baltimore, Cincinnati, St. Louis. 243 pp.

Women's Bureau—

Bulletins: 147. Summary of state reports of occupational diseases with a survey of preventive legislation, 1932–1934. 42 pp. 10 *c.* 148. The employed woman homemaker in the United States; her responsibility for family support. 22 pp. 10 *c.* [Washington, 1936. 9″ × 6″.]

(d) International.

International Labour Office—

Studies and reports, series B. No. 24. The co-operative movement and better nutrition: standard definition of foodstuffs: education of producers and consumers. Geneva (London, P. S. King), 1937. 9½″ × 6¼″. 66 pp. 1*s.* 6*d.*

II.—AUTHORS AND MISCELLANEOUS.

Blaisdell (*William M.*). Financing security trading. Philadelphia: University of Pennsylvania, 1935. 9¼″ × 6″. 199 pp.

Brij Narain. Indian socialism. Lahore: Atma Ram, 1937. 7¼″ × 5″. xxiii + 158 pp. 3*s.* 6*d.*

Burrows (*Raymond*). The problems and practice of economic planning. London: P. S. King, 1937. 8½″ × 5½″. 280 pp. 10*s.* 6*d.*

Chisholm (*Cecil*), editor. Marketing survey of the United Kingdom. London: Business Publications, 1936. 9¾″ × 7¼″. 548 pp.

Cochran (*W. G.*). The χ^2 distribution for the binomial and Poisson series, with small expectations. London: reprint from *Annals of Eugenics*, Part II, 1936. Pp. 207–217. 10¼″ × 7¾″.

Daugherty (*C. R.*), *de Chazeau* (*M. G.*) and *Stratton* (*S. S.*). The economics of the iron and steel industry. New York and London: McGraw-Hill, 1937. 9″ × 6″. 2 vols. 70*s.*

Einzig (*Paul*). The theory of forward exchange. London: Macmillan, 1937. 8¾″ × 5½″. xxi + 520 pp. 21*s.*

Fisher (*Irving*). Changes in the wholesale price index in relation to factory employment. Reprint from *Journal of the American Statistical Association*, September, 1936. Pp. 496–506. 9¼″ × 6″. (From the author.)

——. Income in theory and income taxation in practice. New Haven, Conn.: preprint of article to appear in *Econometrica*, January, 1937. 10″ × 7″. 55 pp. (*Id.*)

——. Income in theory and income taxation in practice. New Haven: reprint from *Econometrica*, January, 1937. 10″ × 7″. 55 pp. (*Id.*)

——. The bankers' interest in 100% money. New York: reprint from *Bankers' Magazine*, 1936. 9½″ × 6¼″. 4 pp.

Fisher (*R. A.*). Uncertain inference. Boston, Mass.: reprint from *Proceedings of the American Academy of Arts and Sciences*, October, 1936. Pp. 245–258. 9¼″ × 6″.

II.—Authors and Miscellaneous—*Contd.*

Gilmour (*J. R.*) and *Martin* (*W. J.*). The weight of the parathyroid glands. Reprint from *Journal of Pathology and Bacteriology*, No. 2, 1937. Pp. 431–462. 9¼″ × 6″. (From Mr. W. J. Martin.)

Gordon (*R. A*). A selected bibliography of the literature on economic fluctuations 1930–36. Cambridge, Mass.: *Review of Economic Statistics*, February, 1937. Pp. 37–68. 10¾″ × 8¼″.

Gurtner (*Josef*). Die katholische Kirchenmusik österreichs im Lichte der Zahlen. Baden: R. M. Rohrer, 1936. 9″ × 6″. viii + 310 pp.

Hawtrey (*R. G.*). Capital and employment. London: Longmans Green, 1937. 8½″ × 5½″. xi + 348 pp. 15*s.*

Hoffman (*F. L.*). Cancer and diet, with facts and observations on related subjects. Baltimore: Williams and Wilkins Co., 1937. 9″ × 6″. xx + 767 pp. $5. (From the author.)

Institute of Actuaries and the Faculty of Actuaries in Scotland. Continuous investigation into the mortality of assured lives. A 1924–29 light and A 1924–29 heavy. Mortality functions and monetary tables. Cambridge: published on behalf of the Institute . . . at the University Press, 1937. 9¾″ × 6¼″. viii + 147 pp. 42*s.*

Institute of Chartered Accountants. Library catalogue. Vol. I. Subjects and authors. Vol. II. Bibliography of book-keeping. London: the Institute, 1937. 8½″ × 5½″. 2 vols. (From the Library Committee.)

Institute of Public Administration. Research studies in administration. Staff reports in the public service (being an interim report of a research group of the Institute . . .). London: the Institute, 1936. 9½″ × 6½″. 69 pp. 1*s.* 6*d.*

Johns Hopkins University. School of Hygiene and Public Health. Collected papers from the Department of Biology . . . Vol. XIII. Baltimore, Maryland, 1936. 9¾″ × 6¾″. 19 papers.

Jones (*D. Caradog*). Trade revival in a depressed area. Liverpool: University Press, 1937. 8½″ × 5½″. 72 pp. 2*s.* 6*d.*

Kretschmann (*Jenny Griziotti*). Autarchia economica e finanziaria ed economia mondiale. Padua: CEDAM, 1937. 10″ × 7″. vi + 145 pp. *L.* 18.

London, University of. University of London, 1836–1936. Centenary commemorative volume, June 27th–July 3rd, 1936. London, 1936. 9½″ × 7½″. 168 pp. (From the Vice-Chancellor.)

Lotka (*A. J.*). Annual survey of statistical technique, developments in the analysis of multivariate data, Part I. Colorado: reprint from *Econometrica*, July 1936. Pp. 264–268. 10″ × 7″.

——. Modern trends in the birth-rate. Philadelphia: preprint from *Annals of the American Academy of Political and Social Science*, November, 1936. 9¼″ × 6¼″. 13 pp.

——. The geographic distribution of intrinsic natural increase in the United States, and an examination of the relation between several measures of net reproductivity. Reprint from *Journal of the American Statistical Association*, June, 1936. Pp. 273–294. 9¼″ × 6″.

Lundberg (*Erik*). Studies in the theory of economic expansion. London: P. S. King, 1937. 8¼″ × 5″. x + 265 pp. 10*s.*

Luzzatto-Fegiz (*P.*). La popolazione di Trieste. Trieste: Istituto Statistico Economico, 1929. 13½″ × 9¾″. 106 pp. *L.* 30.

Lyon, Université de. Annales de l'Université . . . Institut de Sciences Financières et d'Assurances. Travaux nos. 46 à 52. Paris: Hermann, 1936. 10″ × 6½″. 118 pp.

Mitra (*K.*). Fertility and its relation to social conditions: a study of the vital statistics of London in 1930–32. Cambridge: reprint from *Journal of Hygiene*, January 1937. Pp. 108–123. 10¼″ × 7″. (From the author.)

Mortara (*G.*). L'Assicurazione sulla vita e la politica dell' incremento demografico. Conferenza tenuta all Istituto Nazionale delle Assicurazioni . . . Rome, 1930. 10″ × 7″. 18 pp.

——. Comparazione statistica fra due gruppi di anguille di diversa provenienza. Venice, 1915. 10½″ × 7¼″. 23 pp.

——. Costo e rendimento economico dell' uomo. Rome: reprint from *Atti dell' Istituto Nazionale delle Assicurazioni*, Vol. VI, 1934. 10″ × 7″. 41 pp.

II. Authors and Miscellaneous—*Contd.*

Mortara (*G.*). Elementi statistici sull' economia agraria italiana. Rome: reprint from *Rivista di Politica Economica*, Fasc. 7–8, 1935. 10½" × 8". 17 pp.

——. La fecondità legittima nelle regioni meridionali. Naples: reprint from *Rassegna Economica del Banco di Napoli*, No. 6, 1935. 11½" × 9". 7 pp.

——. Incremento demografico e politica economica. Pisa: reprint from *Archivio di Studi Corporativi*, Fasc. II, 1930. 9¾" × 6¾". 10 pp.

——. Misure ed indici delle disuguaglianze statistiche. Milan: reprint from Rendiconti del *Seminario Matematico e Fisicodi Milano*, Vol. VIII, 1934. 9½" × 6½". 23 pp.

——. Natalità e fecondità nell' Italia meridionale. Naples: reprint from *Rassengna Economica del Banco di Napoli*, No. 4, 1935. 11¼" × 8¾". 11 pp.

——. Natalità e fecondità in Sicilia. Palermo: reprint from *Bollettino Mensile dell' Osservatorio Economico del Banco di Sicilia*, Nos. 7–8, 1935. 10¾" × 8". 11 pp.

——. Sulla politica doganale italiana nel dopo-guerra. Padua: reprint from *Annali di Economia*, Vol. IX, 1934. 9½" × 6½". 68 pp.

——. A proposito di previsioni economiche. Rome: reprint from *Atti dell' Istituto Nazionale delle Assicurazioni*, Vol. V, 1933. 10" × 7". 44 pp.

——. Interventi statali nella vita economica della Gran Bretagna. Padua: reprint from *Annali di Economia*, Vol. X, 1935. 9½" × 6½". 24 pp.

——. Valori monetari e valori reali nelle operazioni di prestito. Milan: reprint from *Rivista Italiana di Science Commerciali*, No. 2, 1936. 9½" × 6½". 17 pp. [From the author.]

Owen (*Laurence A.*). The Russian peasant movement 1906–1917. London: P. S. King, 1937. 8½" × 5½". xix + 267 pp. 12*s.* 6*d.*

Pixley (*Francis W.*). How to read a balance sheet. 9th ed. Edited by Andrew Binnie. London: Gee and Co. 8½" × 5½". 10 + 71 pp. 5*s.* 6*d.*

Quensel (*Carl-Erik*). Barnantalet i de Svenska aktenskaper. Lund: Särtryck ur Statsvetenskaplig Tidskrift, Haft 3, 1936. Pp. 203–226. 9½" × 6½".

Revue d'économie politique. Cinquantenaire de la Revue . . . 1887–1937. L'enseignement économique en France et à l'étranger, par *C. Rist*, *G. Pirou*, *A. Landry*, *J. Rueff*, *F. Divisia*, *A. de Moncetz*, *R. Roy*, *A. Plant*, *L. Robbins*, *R. Harrod*, *E. Robinson*, *G. Allen*, *J. Jewkes*, *W. Gerloff*, *F. von Bissing*, *G. del Vecchio*, *G. Borgatta*, *M. Ansiaux*, *R. von Strigl*, et *H. Laufenburger*. Paris: Recueuil Sirey, 1937. 9¾" × 6¼". viii + 262 pp.

Stamp (*Sir Josiah*). The science of social adjustment. London: Macmillan, 1937. 8½" × 5½". vii + 174 pp. 7*s.* 6*d.*

Sutherland (*Stella E.*). Population distribution in colonial America. New York: Columbia University Press (London: H. Milford), 1936. 9" × 6". xxxii + 353 pp. 20*s.*

Tenderini (*Dionisio*). Analisi sui prezzi in Italia dal 1901 al 1932. Padua: CEDAM, 1936. 10" × 7". 118 pp. *L.* 20.

Thirring (*Ludwig*). Zur Methodik der Statistik der menschlichen Anhaufungsverhaltnisse. Budapest: reprint from *Journal de la Société Hongroise de Statistique*, Nr. 2–3. Pp. 289–312. 9" × 6".

Todhunter (*Ralph*). The Institute of Actuaries' text-book on compound interest and annuities-certain. 4th ed., revised by *R. C. Simmonds* and *T. P. Thompson*. Cambridge: for the Institute at the University Press, 1937. 8½" × 5½". xiv + [1] + 270 pp. 17*s.* 6*d.* (From the Institute.)

Wicksell (*S. D.*). Expansions of frequency functions for integer variates in series. Sartryck ur Förhandlingar vid Ättonde Skandinaviska Matematikerkongressen i Stockholm, 1934. Pp. 306–325. 9¾" × 6½".

Wilzin (*Leo*). Musikstatistik. Logik und Methodik gesellschaftsstatistischer Musikforschung. Wien: Franz Deuticke, 1937. 9" × 6". 119 pp. *M.* 4.

Wheldon (*H. J.*). Business statistics and statistical method. London: Macdonald and Evans, 1936. 8½" × 5½". ix + 223 pp. 5*s.*

Yates (*F.*). Incomplete randomized blocks. London: reprint from *Annals of Eugenics*, Part II, 1936 Pp. 121–140 10¼" × 7¾".

REGISTRATION OF THE UNITED KINGDOM.

No. I.—ENGLAND AND WALES.

A.—*Serial Table of* BIRTHS, DEATHS *and* MARRIAGES, *returned in the Years* **1930–1936,** *and in the* QUARTERS *of those Years.*

Calendar YEARS, **1930–1936** :—*Numbers.*

YEARS	1930.	1931.	1932.	1933.	1934.	1935.	1936.*
Births	648,811	632,081	613,972	580,413	597,642	598,756	605,659
Stillbirths	27,577	26,933	26,471	25,084	25,209	25,435	25,014
Deaths	455,427	491,630	484,129	496,465	476,810	477,401	495,798
Marriages	315,109	311,847	307,184	318,191	342,307	349,536	353,561

(I.) LIVE BIRTHS :—*Numbers in* QUARTERS *of each Calendar Year,* **1930–1936.**

QUARTERS.	1930.	1931.	1932.	1933.	1934.	1935.	1936.*
Jan.–Mar. ...	158,545	159,663	152,116	148,597	149,396	146,363	148,136
Apr.–June ...	170,042	163,760	165,403	154,047	156,513	155,892	157,700
July–Sept. . .	165,596	161,133	156,186	147,959	149,224	155,498	155,746
Oct.–Dec.	154,628	147,525	140,267	129,810	142,509	141,003	144,077

(II.) STILLBIRTHS :—*Numbers.*

QUARTERS.	1930.	1931.	1932.	1933.	1934.	1935.	1936.*
Jan.–Mar. ...	7,069	7,091	6,883	6,684	6,453	6,491	6,362
Apr.–June ...	7,098	6,940	7,152	6,675	6,637	6,620	6,497
July–Sept. ...	6,850	6,568	6,283	5,902	5,979	6,304	6,056
Oct.–Dec.	6,560	6,334	6,153	5,823	6,140	6,020	6,099

(III.) DEATHS (*excluding stillbirths*) :—*Numbers.*

QUARTERS.	1930.	1931.	1932.	1933.	1934.	1935.	1936.*
Jan.–Mar. ...	131,967	162,208	153,451	169,983	146,003	132,657	153,583
Apr.–June . .	111,336	114,694	116,228	108,591	119,007	121,935	119,557
July–Sept. ...	96,389	96,735	97,984	95,810	97,469	100,066	99,941
Oct.–Dec. .. .	115,735	117,993	116,466	122,081	114,331	122,743	122,717

(IV.) MARRIAGES :—*Numbers.*

QUARTERS.	1930.	1931.	1932.	1933.	1934.	1935.	1936.*
Jan.–Mar. ..	48,825	46,574	62,315	44,298	58,744	51,441	49,668
Apr.–June ...	88,138	85,380	68,968	85,597	84,956	98,388	100,269
July–Sept. ...	98,392	99,415	94,917	103,113	109,358	110,530	115,211
Oct.–Dec.	79,754	80,478	80,984	85,183	89,249	89,177	88,413

* Provisional.

Annual Rates of BIRTHS, DEATHS *and* PERSONS MARRIED, *per* 1,000 PERSONS LIVING *in the Years* **1929–1936,** *and in the* QUARTERS *of those Years.*

Calendar YEARS, **1929–1936** :—*General Ratios.*

YEARS…………	**1929.**	**1930.**	**1931.**	**1932.**	**1933.**	**1934.**	**1935.**	**1936.***
Estd. Popln. *in thousands* in middle of each Year	39,607,	39,806,	39,988,	40,201,	40,350,	40,467,	40,645,	40,839,
Live Births …	16·3	16·3	15·8	15·3	14·4	14·8	14·7	14·8
Stillbirths ……	0·68	0·69	0·67	0·66	0·62	0·62	0·63	0·61
Deaths ………	13·4	11·4	12·3	12·0	12·3	11·8	11·7	12·1
Persons Married	15·8	15·8	15·6	15·3	15·8	16·9	17·2	17·3

(I.) LIVE BIRTHS :—*Ratio per* 1,000, *in* QUARTERS *of each Calendar Year,* **1929–1936.**

QUARTERS.	**1929.**	**1930.**	**1931.**	**1932.**	**1933.**	**1934.**	**1935.**	**1936.***
Jan.–Mar. …	16·4	16·2	16·2	15·2	14·9	15·0	14·6	14·6
Apr.–June …	17·2	17·1	16·4	16·5	15·3	15·5	15·4	15·5
July–Sept. …	16·4	16·5	16·0	15·5	14·5	14·6	15·2	15·2
Oct.–Dec. ……	15·1	15·4	14·6	13·9	12·8	14·0	13·8	14·0

(II.) STILLBIRTHS :—*Ratio per* 1,000.

QUARTERS.	**1929.**	**1930.**	**1931.**	**1932.**	**1933.**	**1934.**	**1935.**	**1936.***
Jan.–Mar. …	0·70	0·72	0·72	0·69	0·67	0·65	0·65	0·63
Apr.–June …	0·70	0·72	0·70	0·72	0·66	0·66	0·65	0·64
July–Sept. …	0·66	0·68	0·65	0·62	0·58	0·59	0·62	0·59
Oct.–Dec. ……	0·65	0·65	0·63	0·61	0·57	0·60	0·59	0·59

(III.) DEATHS :—*Ratio per* 1,000.

QUARTERS.	**1929.**	**1930.**	**1931.**	**1932.**	**1933.**	**1934.**	**1935.**	**1936.***
Jan.–Mar. …	20·9	13·4	16·5	15·4	17·1	14·6	13·2	15·1
Apr.–June …	12·0	11·2	11·5	11·6	10·8	11·8	12·0	11·8
July–Sept. …	9·7	9·6	9·6	9·7	9·4	9·6	9·8	9·7
Oct.–Dec. ……	11·3	11·5	11·7	11·5	12·0	11·2	12·0	12·0

(IV.) PERSONS MARRIED :—*Ratio per* 1,000.

QUARTERS.	**1929.**	**1930.**	**1931.**	**1932.**	**1933.**	**1934.**	**1935.**	**1936.***
Jan.–Mar. …	11·1	9·9	9·4	12·5	8·9	11·8	10·3	9·8
Apr.–June …	15·3	17·8	17·1	13·8	17·0	16·8	19·4	19·7
July–Sept. …	20·2	19·6	19·7	18·8	20·3	21·4	21·6	22·4
Oct.–Dec. ……	16·6	15·9	16·0	16·0	16·8	17·5	17·4	17·2

* Provisional.

B.—*Special Town Table*:—POPULATION; BIRTH-RATE *and* DEATH-RATE (*Civilians*) *in each Quarter of* **1936** *in certain of the* 122 *Great Towns.*

Cities and boroughs.	Estimated resident population mid-1935.	Annual Rate to 1,000 Living during the thirteen weeks ending							
		March 28, 1936. (1st quarter.)		June 27, 1936. (2nd quarter.)		Sept. 26, 1936. (3rd quarter.)		Jan. 2, 1937. (4th quarter.)	
		Live Births	Deaths†	Live Births	Deaths†	Live Births	Deaths†	Live Births	Deaths†
122 Great towns ...	20,860,650	14·8	15·2	15·7	11·5	15·1	9·2	13·7	11·8
Including—									
London (Met. Bs.)	4,185,200	13·6	15·7	14·0	11·7	13·5	9·0	12·6	12·0
West Ham C.B.	270,700	16·2	13·0	16·0	9·5	15·4	8·7	14·0	10·3
Croydon C.B. ...	242,100	12·5	13·8	13·7	10·4	14·2	8·2	13·1	9·8
Brighton C.B. ...	147,800	12·0	17·4	15·3	14·4	13·9	11·6	12·3	13·3
Portsmouth C.B.	250,200	15·7	13·2	17·8	12·1	15·3	9·5	13·6	11·4
Bristol C.B. ...	413,100	14·4	14·8	14·5	11·6	14·8	9·3	13·2	12·0
Cardiff C.B. ...	221,400	15·1	13·8	15·9	10·0	15·4	8·4	14·1	11·1
Swansea C.B. ...	164,800	15·0	15·1	18·0	12·0	15·3	9·6	13·5	11·2
Wolverh'ton C.B.	141,400	16·2	13·6	17·2	10·4	17·4	9·0	15·6	10·6
Birmingham C.B.	1,013,700	15·5	15·0	17·0	10·8	16·2	8·8	15·6	11·2
Norwich C.B. ...	124,700	13·2	14·9	13·8	11·6	13·2	8·8	12·1	11·0
Leicester C.B. ...	261,000	14·9	15·0	15·9	11·0	14·1	8·4	13·1	11·2
Nottingham C.B.	280,200	15·7	17·1	15·6	12·0	15·4	9·4	14·8	13·2
Derby C.B. ...	140,800	13·4	15·2	15·6	10·6	15·2	9·2	13·6	12·4
Birkenhead C.B.	149,400	16·9	16·1	17·4	12·0	15·4	8·9	14·9	10·7
Liverpool C.B. ...	854,500	21·0	16·7	21·1	12·4	20·1	9·9	19·2	12·6
Bolton C.B. ...	174,900	11·6	16·7	12·9	12·2	13·0	11·1	11·9	12·9
Manchester C.B.	748,100	15·4	17·2	15·6	12·7	15·1	10·3	13·8	13·4
Salford C.B. ...	210,000	15·3	17·5	15·5	11·8	15·2	9·3	12·6	13·6
Oldham C.B. ...	133,300	12·0	16·6	14·2	14·5	12·5	10·6	11·6	14·9
Burnley C.B. ...	93,100	11·8	17·0	13·0	13·4	11·7	9·9	11·5	13·8
Blackburn C.B. ...	118,200	11·3	18·7	12·5	13·4	11·2	11·0	11·1	12·4
Preston C.B. ...	116,200	14·7	18·3	14·7	13·3	15·3	11·0	12·6	12·1
Huddersfield C.B.	115,000	11·7	17·3	13·9	14·2	11·9	11·0	12·2	13·0
Halifax C.B. ...	97,100	11·7	17·6	12·6	15·3	12·6	11·6	12·2	15·1
Bradford C.B. ...	292,200	13·3	19·2	13·6	13·9	13·8	11·1	12·5	14·2
Leeds C.B. ...	487,200	14·8	17·2	16·1	12·9	15·4	10·4	14·1	13·4
Sheffield C.B. ...	520,500	14·7	14·6	16·1	11·9	15·3	9·3	14·1	11·1
Kingston - upon - Hull C.B. ...	322,200	16·6	16·3	17·9	11·6	16·6	9·9	16·2	12·2
Sunderland C.B....	185,100	19·8	14·5	20·8	12·3	19·1	9·9	17·9	13·1
Gateshead C.B.	121,200	16·3	16·4	17·6	12·6	16·7	9·9	17·0	11·6
Newcastle - on - Tyne	292,700	15·3	15·5	16·1	12·2	15·8	10·8	14·8	12·6

† Excluding stillbirths.

Note.—The 122 great towns are those with populations exceeding 50,000 persons at the Census of 1931.

No. II.—SCOTLAND.

BIRTHS, DEATHS AND MARRIAGES IN THE YEAR ENDED DECEMBER 31, 1936.

I.—*Serial Table:—Number of* BIRTHS, DEATHS *and* MARRIAGES *in Scotland, and their Proportion to the Population estimated to the Middle of each Year, during each Quarter of the Years* **1932–1936** *inclusive.*

	1932.		1933.		1934.		1935.		1936.	
	Number.	Per 1,000.	Number.	Per 1,000.	Number	Per 1,000.	Number.	Per 1,000.	Number.	Per 1,000.
1st Quarter—										
Births ...	23,069	19·0	21,785	18·0	22,744	18·7	21,978	18·0	22,548	18·2
Deaths ..	19,634	16·2	20,750	17·1	17,406	14·3	19,177	15·7	20,196	16·3
Marriages	7,686	6·3	7,052	5·8	7,695	6·3	7,697	6·3	7,731	6·3
2nd Quarter—										
Births ...	24,245	20·0	23,211	19·0	23,247	18·9	23,259	18·8	23,587	19·1
Deaths ...	16,407	13·5	15,121	12·3	16,730	13·6	16,205	13·1	16,214	13·1
Marriages	7,877	6·5	8,178	6·7	8,856	7·2	9,108	7·4	9,449	7·6
3rd Quarter—										
Births ...	22,033	18·0	21,135	17·1	21,301	17·1	21,566	17·3	21,459	17·2
Deaths ...	13,192	10·7	13,094	10·6	13,300	10·7	13,461	10·8	13,708	11·0
Marriages	9,337	7·6	10,252	8·3	10,764	8·7	11,284	9·0	11,408	9·1
4th Quarter—										
Births ...	21,653	17·6	20,415	16·5	21,544	17·3	21,125	16·9	21,326	17·1
Deaths ...	16,812	13·7	15,883	12·8	16,305	13·1	16,488	13·2	16,629	13·3
Marriages	8,257	6·7	8,719	7·0	9,634	7·7	9,908	7·9	9,315	7·5
Year—										
Population	4,883,000		4,912,000		4,936,000		4,955,500		4,971,200	
Births ...	91,000	18·6	86,546	17·6	88,836	18·0	87,928	17·8	88,920	17·9
Deaths ...	66,045	13·5	64,848	13·2	63,741	12·9	65,331	13·2	66,747	13·4
Marriages	33,157	6·8	34,201	7·0	36,949	7·5	37,997	7·7	37,903	7·6

II.—*Number of Births, Deaths, and Marriages in the* 263 *Large Burghs and Other Districts of SCOTLAND and their proportion to the population during each quarter of* **1936.**

	Births.		Deaths.		Marriages.	
	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.
1st quarter—						
Large Burghs	13,017	19·2	11,363	16·8	4,977	7·3
including Glasgow ...	5,675	20·3	4,903	17·5	2,089	7·5
Edinburgh ...	1,893	16·4	1,979	17·1	856	7·4
Dundee ...	835	18·8	769	17·3	319	7·2
Other Districts	9,531	17·1	8,832	15·8	2,754	4·9
2nd quarter—						
Large Burghs	13,482	19·9	9,130	13·5	6,018	8·9
including Glasgow ...	5,930	21·2	4,029	14·4	2,572	9·2
Edinburgh ...	2,010	17·4	1,462	12·7	1,067	9·2
Dundee ...	881	19·8	619	13·9	364	8·2
Other Districts	10,105	18·1	7,083	12·7	3,431	6·2
3rd quarter—						
Large Burghs	12,201	17·8	7,647	11·1	7,706	11·2
including Glasgow ...	5,330	18·9	3,285	11·6	3,263	11·5
Edinburgh ...	1,757	15·0	1,272	10·9	1,580	13·5
Dundee ...	712	15·8	518	11·5	436	9·7
Other Districts	9,258	16·4	6,060	10·7	3,702	6·6
4th quarter—						
Large Burghs	12,044	17·6	9,520	13·9	5,893	8·6
including Glasgow ...	5,340	18·9	4,182	14·8	2,496	8·8
Edinburgh ...	1,730	14·8	1,513	13·0	976	8·4
Dundee ...	744	16·6	625	13·9	344	7·7
Other Districts	9,282	16·5	7,109	12·6	3,422	6·1

No. III.—NORTHERN IRELAND.

NORTHERN IRELAND.—*Number of Births, Deaths and Marriages for each Quarter of* 1936 *and their Proportion to the Population.*

	Births.		Deaths.		Marriages.	
	Number.	Annual rate per 1,000 of population.	Number.	Annual rate per 1,000 of population.	Number.	Annual rate per 1,000 of population.
1st quarter	6,448	19·9	5,878	18·2	1,723	5·3
2nd ,, ...	6,795	21·0	4,481	13·9	2,455	7·6
3rd ,, ...	6,612	20·5	3,560	11·0	2,784	8·6
4th ,, ...	6,055	18·7	4,512	14·0	2,207	6·8
Total for year 1936	25,910	20·0	18,431	14·3	9,169	7·09

Population of Northern Ireland, calculated provisionally to mid-1936 (inclusive of military) :—1,293,000.

	Births.		Deaths.		Marriages.	
	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.	Number.	Annual rate per 1,000 persons.
1st quarter—					Details not available.	
Total rural districts	2,849	18·5	2,832	18·3		
Total co. boroughs and urban dists.	3,599	22·5	3,046	19·1		
Belfast C.B. ...	2,310	22·3	1,959	18·9		
Londonderry C.B.	309	27·4	192	17·0		
2nd *quarter*—						
Total rural districts	2,925	18·9	2,163	14·0		
Total co. boroughs and urban dists.	3,870	24·2	2,318	14·5		
Belfast C.B. ...	2,472	23·8	1,496	14·4		
Londonderry C.B.	338	29·9	144	12·8		
3rd quarter—						
Total rural districts	2,905	18·8	1,692	11·0		
Total co. boroughs and urban dists.	3,707	23·2	1,868	11·7		
Belfast C.B. ...	2,303	22·2	1,199	11·6		
Londonderry C.B.	344	30·5	144	12·8		
4th quarter—						
Total rural districts	2,658	17·2	2,186	14·2		
Total co. boroughs and urban dists.	3,397	21·3	2,326	14·6		
Belfast C.B. ...	2,167	20·9	1,563	15·1		
Londonderry C.B.	294	26·0	248	13·1		

No. IV.—IRISH FREE STATE.

Number of Births, Deaths and Marriages in the Irish Free State for each quarter of the year 1936 *and their proportion to the population.*

1936.	Births.		Deaths.		Marriages.	
	Number.	Annual rate per 1,000 of population	Number.	Annual rate per 1,000 of population.	Number.	Annual rate per 1,000 of population
1st quarter	14,429	19·5	12,869	17·4	3,807	5·1
2nd „	15,040	20·3	10,801	14·6	3,430	4·6
3rd „	14,851	20·0	8,667	11·7	4,228	5·7
4th „	13,700	18·5	10,253	13·8	3,357	4·5
Total for year 1936	58,020	19·6	42,590	14·4	14,822	5·0

Population of the Free State estimated to mid-1936 :—2,965,000

1936.	Births.		Deaths.		Marriages.	
	Number.	Annual rate per 1,000 persons.	Number	Annual rate per 1,000 persons.	Number	Annual rate per 1,000 persons.
1st quarter—					Details not available.	
Total rural districts	8,957	16·8	8,746	16·5		
Total urban „	5,472	24·1	4,123	18·2		
Dublin City ..	2,859	26·4	2,048	18·9		
Cork Co. Borough	477	24·3	395	20·1		
2nd quarter—						
Total rural districts	9,122	18·1	7,440	14·7		
Total urban „	5,918	25·1	3,361	14·2		
Dublin City ..	2,996	25·6	1,689	14·3		
Cork Co. Borough	511	26·0	281	14·3		
3rd quarter—						
Total rural districts	9,002	18·0	5,810	11·6		
Total urban „	5,849	24·3	2,857	11·8		
Dublin City ...	3,015	25·8	1,442	12·3		
Cork Co. Borough	478	23·7	227	11·2		
4th quarter—						
Total rural districts	8,523	17·0	6,832	13·7		
Total urban „	5,177	21·5	3,421	14·2		
Dublin City ..	2,712	23·2	1,837	15·7		
Cork Co. Borough	455	22·5	285	14·1		

Note.—These rates are based on the Census of 1936.

No. V.—GREAT BRITAIN AND IRELAND.

SUMMARY *of* BIRTHS, DEATHS *and* MARRIAGES, *in the Year* 1936.

(Compiled from the Quarterly Returns of the respective Registrars-General.)

Countries.	[000's omitted.]		Live Births.	Per 1,000 of Population.	Deaths.	Per 1,000 of population.	Marriages.	Per 1,000 of population.
	Area in statute acres.	Population middle 1936, estimated						
		No.	No.	Ratio.	No.	Ratio.	No.	Ratio.
England and Wales ...	37,340	40,839	605,659	14·8	495,798	12·1	353,561	8·6
Scotland ...	9,462	4,971	88,920	17·9	66,747	13·4	37,903	7·6
Northern Ireland ...	3,488	1,293	25,910	20·0	18,431	14·3	9,169	7·09
Great Britain and Northern Ireland	60,290	47,103	720,489	15·3	580,976	12·3	400,633	8·5
Irish Free State ...	17,254	2,965	58,020	19·6	42,590	14·4	14,822	5·0

Exports:—*Declared value of U.K. Produce and Manufactures, and of Imported Merchandise, exported from the United Kingdom in the years ended December 31, 1934, 1935, 1936.*

Countries to which consigned.	1934.		1935.		1936.	
	Exports.	Re-exports.	Exports.	Re-exports.	Exports.	Re-exports.
	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.
Russia	3,640	3,905	3,483	6,244	3,492	9,466
Finland	3,612	387	4,153	464	4,219	362
Sweden	9.083	793	9,723	819	10,388	910
Norway	6,292	254	6,619	387	7,147	252
Denmark,* with Faroe Islands	13,357	731	13,759	777	14,948	642
Poland, including Dantzig	3,001	1,262	3,792	1,309	4,864	1,704
Germany	14,008	8,899	18,940	7,446	18,988	6,821
Netherlands *	12,090	1,991	11,658	2,303	12,359	1,953
Java	1,832	40	1,821	39	1,986	41
Belgium *	8,796	4,111	8,680	4,443	9,467	4,681
France *	16,751	6,719	16,702	6,806	17,785	8,028
Switzerland	4,648	790	4,077	928	3,912	1,066
Portugal *	3,629	157	4,173	229	2,777	354
Spain *	4,794	274	5,344	414	2,933	242
Italy *	9,314	1,223	6,799	1,356	540	403
Czechoslovakia	1,247	240	1,432	310	1,822	505
Greece	2,682	240	2,924	282	3,322	322
Roumania	2,679	80	1,213	54	1,118	45
Turkey, European and Asiatic, incl. Smyrna and Armenia	1,172	58	1,021	27	949	22
Egypt	6.528	226	7,631	204	7,757	183
China †	6,513	80	5,066	40	5,817	66
Japan ‡	3,810	165	4,006	132	3,567	90
United States	17,571	5,642	22,894	7,225	27,629	9,203
Cuba	919	10	874	18	1,019	14
Mexico	1,583	16	1,386	13	1,387	8
Peru	1,101	29	1,030	42	1,133	30
Chile	1,448	43	2,051	41	1,748	25
Brazil	5,742	140	4,757	139	4,764	107
Uruguay	1,694	25	1,516	42	1,920	36
Argentine Republic	14,655	249	15,257	344	15,271	276
Other Countries	26,221	1,188	28,709	1,464	28,764	1,769
Total—Foreign Countries	210,412	40,167	221,490	41,341	223,792	49,626
BRITISH POSSESSIONS.						
Irish Free State	19,525	5,280	20,240	4,920	21,035	4,909
British West Africa	5,754	385	9,300	500	11,395	557
Union of South Africa	30,219	627	33,601	655	37,519	697
British East Africa	2,445	55	2,921	71	3,047	78
British India, with Burma	36,675	540	37,849	623	34,133	486
Straits Settlements and Federated Malay States	6,993	140	7,409	155	8,369	119
Ceylon and Dependencies	2,837	71	3,199	80	3,209	67
Australia	26,243	715	29,338	700	32,271	723
New Zealand	11,438	260	13,359	273	17,334	347
Canada	19,726	1,388	21,383	1,177	23,256	1,080
Brit. W. Indies, with Bahamas	4,861	140	4,968	149	5,232	132
Other Possessions	18,857	1,476	20,738	1,659	20,127	1,596
Total—British Possessions	185,573	11,077	204,345	10,962	216,927	10,791
Total — Foreign Countries and British Possessions	395,986	51,243	425,835	55,303	440,719	60,417

* Excluding colonies.
† Excluding Hong Kong, Macao, and leased territories; including Manchuria.
‡ Including Formosa and leased territories; excluding Korea.

Imports.—*Declared value of merchandise imported into the United Kingdom in the years ended December* 31, 1934, 1935, 1936.

Countries from which consigned.	1934.	1935.	1936.
	£'000.	£'000.	£'000.
Russia	17,327	21,764	18,934
Finland	15,215	14,915	18,151
Sweden	17,926	17,010	20,632
Norway, including Spitzbergen	8,359	8,213	8,953
Denmark,* including Faroe Islands ...	32,885	32,038	33,225
Poland, including Dantzig	7,438	7,281	9,863
Germany	30,578	30,076	32,957
Netherlands *	20,947	23,066	25,132
Java	4,222	4,303	2,573
Belgium *	14,563	15,491	18,692
France *	19,236	21,614	25,704
Switzerland	5,487	5,400	6,223
Portugal *	3,179	3,121	3,863
Spain *	11,263	11,119	10,665
Italy *	8,422	7,902	2,269
Czechoslovakia	3,681	4,337	5,837
Greece, excluding Crete	2,287	2,095	2,166
Roumania	3,421	3,218	6,272
Turkey, European and Asiatic, including Smyrna and Armenia	926	992	1,297
Egypt	11,470	12,726	13,554
China †	6,142	6,444	7,751
Japan ‡	7,983	8,255	9,805
United States	81,956	87,522	93,300
Cuba	3,768	3,759	5,293
Mexico	3,106	3,320	3,077
Peru	4,879	3,785	4,583
Chile	5,237	5,179	5,248
Brazil	8,440	7,194	9,927
Uruguay	3,180	3,381	3,939
Argentine Republic...	47,030	43,967	45,106
Other Countries	49,576	41,995	60,665
Total—Foreign Countries	460,129	471,482	516,356
BRITISH POSSESSIONS.§			
Irish Free State	17,200	18,757	20,369
British West Africa	6,091	8,217	10,327
Union of South Africa	11,891	13,683	13,499
British East Africa	3,048	3,431	4,786
British India, with Burma	42,102	41,168	51,901
Straits Settlements and Federated Malay States	12,380	10,887	7,015
Ceylon and Dependencies	11,324	10,031	10,091
Australia	49,929	54,286	61,391
New Zealand	40,440	38,123	43,667
Canada	50,390	56,010	75,048
British W. Indies, with Bahamas... ...	6,295	7,026	8,055
Other Possessions	20,195	22,939	26,431
Total—British Possessions	271,285	284,558	332,580
Total—Foreign Countries and British Possessions	731,414	756,041	848,936

---

* Excluding colonies.
† Excluding Hong Kong, Macao and leased territories; including Manchuria.
‡ Including Formosa and leased territories; excluding Korea.
§ Including Protectorates and Mandated Territories.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY

PART III, 1937.

SOME MEASURES OF ECONOMIC ACTIVITY IN INDIA

By Dr. D. B. MEEK, C.I.E., O.B.E.

[Read before the ROYAL STATISTICAL SOCIETY, March 16th, 1937, MR. H. W. MACROSTY, O.B.E., Honorary Secretary, in the Chair.]

I MUST first of all thank the Royal Statistical Society for having honoured me with an invitation to read a paper before its members, and I have felt it my duty to endeavour to prepare some material which I hope will be found appropriate to the occasion. It was at first suggested that "The Trade of India" might form the title of the paper which I should read, but since this subject has been treated in such great detail so frequently, and is in fact dealt with most exhaustively each year in the Annual Review of the Trade of India, prepared by the Director-General of Commercial Intelligence and Statistics in that country, I thought that for an occasion such as this it would be more fitting if I confined myself to setting out some statistical materials which are not so readily available in any of the better-known publications of the Government of India. As is well known to the members of this Society, the volume of statistical data relating to India, in many varied aspects, is very large; but it will also be known to many here to-night that there are certain important gaps in the statistical field covered in India. In particular, India has so far not taken any comprehensive census of Industrial Production. In spite of this defect, however, there is much statistical material, available from published records, which relates to the physical output of industries in India.

A few years before vacating the post of Director-General of Commercial Intelligence in India I began a new publication entitled the *Monthly Survey of Business Conditions in India.* This publication brought together, in a convenient form, all the monthly statistics available which had a bearing on business conditions in India;

and it was my hope that, in time, the monthly series so collated would be analysed and combined in such a manner as to yield some kind of monthly index of business activity in the country. This object involves, of course, a number of important considerations, such as the determination of trends in the various series, the calculation and elimination of seasonal variations, and the method to be adopted in combining the individual series in order to obtain an average index which would give some reliable indication of the general changes in business activity. A certain amount of work in this direction was carried through before I left India; but, so far, it has not been possible to achieve the object aimed at, mainly because of the limitations of staff in Government departments. It is a problem which might perhaps more easily be undertaken by workers in universities and colleges in that country who, as elsewhere, probably have more leisure time than Government officials enjoy to devote to such work. The results which are contained in this paper relate, in the main, to the preliminary stages of the analyses which had as their object the one indicated above. They will include the annual deviations from the general trends of the principal series, together with some endeavour at a combination of these deviations for the purpose of obtaining an average indication of the position from year to year.

In India the principal activities for which figures are available relate to: (1) Agricultural production, (2) Mineral production, (3) Industrial production in the more important large-scale industries, (4) Foreign trade, (5) Railway traffic, (6) Financial statistics, such as cheque clearances. Under agricultural production naturally only annual figures of output are possible, and in the case of some items under mineral production similar limitations prevail; but for all the other series monthly figures can be obtained, and there is therefore considerable material which could be used for the construction of a monthly index of business activity. Further, although India is mainly an agricultural country, a very large proportion of the agricultural production is consumed by the actual producer, and does not enter into the trade and commerce of the country, while the portion which is traded will influence some of the other series which are available on a monthly basis, and therefore this portion of agricultural activity would not be entirely neglected in a monthly index.

Agricultural Production.

In dealing with the production of a country such as India we naturally turn in the first place to the statistics of crop production. Figures of the physical production of the thirteen principal crops grown in India are readily available from Government publications from the year 1909, and these can be utilized to construct an index of

TABLE I.

Crops Selected.	* Weights Assigned to Different Crops.	Actual Production in Basis Period (Pre war Average).	1915.†		1916.		1917.		1918.		1919.		1920.	
			Actual Production.	Production Relative Reduced to Base	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.
Rice	44	286	273	95	327	114	351	123	360	126	243	85	320	112
Wheat	14	95	101	106	87	92	102	107	99	104	75	79	101	106
Barley	4	32	31	97	32	100	33	103	33	103	28	87	32	100
Maize	2	20	21	105	25	125	23	115	24	120	18	90	26	130
Gram	4	32	39	122	34	106	42	131	44	137	19	59	37	116
Sugar, Raws ...	5	23	24	104	26	113	28	122	34	148	25	109	30	130
Tea	2	279	313	112	372	133	370	133	371	133	380	136	377	135
Linseed	2	5	4	80	5	100	5	100	5	100	2	40	4	80
Rapeseed ...	3	12	12	100	11	92	12	100	12	100	8	67	12	100
Sesamum ...	2	5	6	120	5	100	5	100	4	80	3	60	4	80
Groundnut ...	2	6	9	150	11	183	12	200	11	183	6	100	8	133
Jute, Raw ...	7	84	104	124	73	87	83	99	89	106	70	83	85	101
Cotton. Raw ...	9	43	52	121	37	86	45	105	41	95	40	93	58	135
Index Number of Agricultural Production ...	—	—	—	105	—	106	—	117	—	118	—	84	—	113

Note.—The actual production figures of crops for the basic period, as well as for other years, expressed in lakhs ‡ of tons except in the case of cotton, jute and tea. In the case of cotton and jute the production is expressed in lakhs of bales of 400 lbs. each, while in the case of tea it is expressed in millions of lbs.

* For the method of arriving at the weights, please see text.
† The year given as 1915, etc., means the year 1914–15.
‡ One lakh = 100,000.

TABLE I.—*continued.*

Crops Selected.	* Weights Assigned to Different Crops.	Actual Production in Basis Period (Pre-war Average).	1921.		1922.		1923.		1924.		1925.		1926.	
			Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.
Rice	44	286	277	97	331	116	337	118	282	99	311	109	307	107
Wheat	14	95	67	71	98	103	100	105	97	102	89	94	87	92
Barley	4	32	25	78	31	97	31	97	29	91	26	81	26	81
Maize	2	20	21	105	25	125	19	95	22	110	17	85	19	95
Gram	4	32	24	75	44	137	52	162	45	141	42	131	39	122
Sugar, Raws ...	5	23	25	109	26	113	30	130	33	143	25	109	30	130
Tea	2	279	345	124	274	98	312	112	375	135	375	135	363	130
Linseed	2	5	3	60	4	80	5	100	5	100	5	100	4	80
Rapeseed ...	3	12	9	75	12	100	12	100	11	92	12	100	9	75
Sesamum ...	2	5	4	80	5	100	5	100	4	80	5	100	4	80
Groundnut ...	2	6	10	167	10	167	12	200	11	183	15	250	20	333
Jute, Raw ...	7	84	59	70	40	48	54	64	84	100	81	96	89	106
Cotton, Raw ...	9	43	36	84	45	105	51	119	52	121	61	142	62	144
Index Number of Agricultural *Production* ...	—	—	—	90	—	108	—	114	—	107	—	111	—	112

Note.—The actual production figures of crops for the basic period, as well as for other years, expressed in lakhs ‡ of tons except in the case of cotton, jute and tea. In the case of cotton and jute the production is expressed in lakhs of bales of 400 lbs. each, while in the case of tea it is expressed in millions of lbs.

* For the method of arriving at the weights, please see text.

‡ One lakh = 100,000.

TABLE I.—*continued.*

Crops Selected.	* Weights Assigned to Different Crops.	Actual Production in Basis Period (Pre-war Average)	1927.		1928.		1929.		1930.		1931.		1932.	
			Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base	Actual Production	Production Relative Reduced to Base.	Actual Production	Production Relative Reduced to Base.
Rice	44	286	297	104	282	99	321	112	311	109	320	112	330	115
Wheat	14	95	90	95	78	82	86	91	105	111	93	98	90	95
Barley	4	32	26	81	21	66	25	78	23	72	24	75	24	75
Maize	2	20	19	95	23	115	20	100	24	120	24	120	22	110
Gram	4	32	40	125	32	100	27	84	31	97	34	106	38	119
Sugar, Raws ...	5	23	33	143	32	139	27	117	28	122	32	139	40	174
Tea	2	279	393	141	391	140	404	145	433	155	391	140	394	141
Linseed	2	5	4	80	3	60	3	60	4	80	4	80	4	80
Rapeseed ...	3	12	10	83	8	67	9	75	11	92	10	83	10	83
Sesamum ...	2	5	4	80	5	100	5	100	5	100	5	100	5	100
Groundnut ...	2	6	20	333	27	450	32	533	27	450	31	516	23	383
Jute, Raw ..	7	84	121	144	102	121	99	118	103	123	112	133	55	65
Cotton, Raw ...	9	43	50	116	60	140	58	135	52	121	49	114	40	93
Index Number of Agricultural Production ...	—	—	—	112	—	109	—	116	—	117	—	118	—	112

Note.—The actual production figures of crops for the basic period, as well as for other years, expressed in lakhs ‡ of tons except in the case of cotton, jute and tea. In the case of cotton and jute the production is expressed in lakhs of bales of 400 lbs. each, while in the case of tea it is expressed in millions of lbs.

* For the method of arriving at the weights, please see text.

‡ One lakh = 100,000.

TABLE I.—*continued.*

Crops Selected.	* Weights Assigned to Different Crops.	Actual Production in Basis Period (Pre-war Average).	1933.		1934.		1935.		1936.	
			Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.	Actual Production.	Production Relative Reduced to Base.
Rice	44	286	311	109	309	108	303	106	277	97
Wheat	14	95	95	100	94	99	97	102	94	99
Barley	4	32	23	72	24	75	—	—	—	—
Maize	2	20	21	105	19	95	—	—	—	—
Gram	4	32	34	106	37	116	—	—	—	—
Sugar, Raws ...	5	23	47	204	51	222	51	222	59	256
Tea	2	279	434	155	383	137	400	143	396	141
Linseed	2	5	4	80	4	80	4	80	4	80
Rapeseed ...	3	12	10	83	9	75	9	75	10	83
Sesamum ...	2	5	5	100	5	100	4	80	5	100
Groundnut ...	2	6	30	500	33	550	19	330	22	366
Jute, Raw ...	7	84	71	86	80	95	64	76	72	86
Cotton, Raw ...	9	43	46	107	50	116	57	132	60	139
Index Number of Agricultural Production ...	—	—	—	116	—	119	—	105	—	116

Note.—The actual production figures of crops for the basic period, as well as for other years, expressed in lakhs ‡ of tons except in the case of cotton, jute and tea. In the case of cotton and jute the production is expressed in lakhs of bales of 400 lbs. each, while in the case of tea it is expressed in millions of lbs.

* For the method of arriving at the weights, please see text.

‡ One lakh = 100,000.

the "volume" of agricultural production by the simple method of combining the various index numbers of production for each crop calculated on a basis of, say, the five pre-war years 1909–10 to 1913–14, by giving to each of these index-numbers a weight proportional to the average values of the particular crop during the same base period. The thirteen crops for which figures are published include all the important crops with two exceptions, viz., jowar and bajra, for which the production statistics are not complete in the earlier years of the period. Table I (printed above) shows (1) the weights assigned to the various crops, (2) the average production of each crop in the base period, and (3) the annual production of each crop from the year 1914–15. Table II contains the combined index numbers of the "volume" of the crop production in India during the period under examination, together with (1) the trend figures of these index numbers as obtained by fitting a curve of the form log (index numbers of production) $= a + bx$, where a and b and constants and x is the time variable, and (2) the percentage deviations year by year from this trend. The actual equation of the trend on this assumed formula is log (I. No. of prod.) $= 2{\cdot}03932 + 0{\cdot}0028x$ where $x = 0$ at the year 1924.

TABLE II.

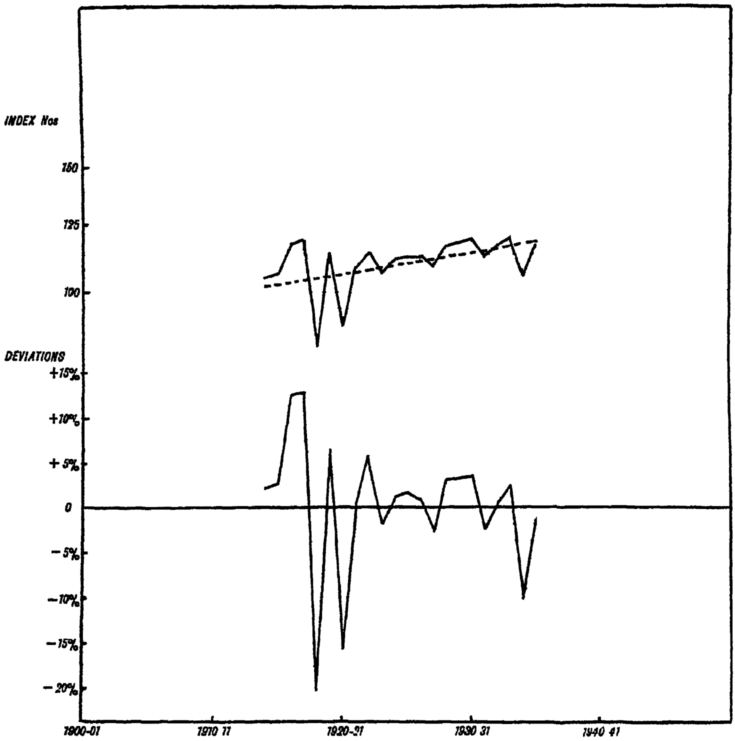
Volume of Crop Production in India.

(1909–10 to 1913–14.) Base = 100.

	Index No	Trend	Deviation.	% Deviation.
Average of 5 years 1909–10 to 1913–14	100			
1914–15	105	102·6	+ 2·4	+ 2·36
1915–16	106	103·3	+ 2·7	+ 2·61
1916–17	117	104·0	+ 13·0	+ 12·50
1917–18	118	104·6	+ 13·4	+ 12·81
1918–19	84	105·3	− 21·3	− 20·2
1919–20	113	106·0	+ 7·0	+ 6·60
1920–21	90	106·7	− 16·7	− 15·6
1921–22	108	107·4	+ 0·6	+ 0·56
1922–23	114	108·1	+ 5·9	+ 5·45
1923–24	107	108·8	− 1·8	− 1·67
1924–25	111	109·5	+ 1·5	+ 1·37
1925–26	112	110·2	+ 1·8	+ 1·63
1926–27	112	110·9	+ 1·1	+ 0·99
1927–28	109	111·6	− 2·6	− 2·33
1928–29	116	112·3	+ 3·7	+ 3·29
1929–30	117	113·1	+ 3·9	+ 3·34
1930–31	118	113·8	+ 4·2	+ 3·69
1931–32	112	114·6	− 2·6	− 2·37
1932–33	116	115·3	+ 0·7	+ 0·61
1933–34	119	116·0	+ 3·0	+ 2·58
1934–35	105	116·8	− 11·8	− 10·09
1935–36	116	117·5	− 1·5	− 1·27

The volume of an agricultural production, as measured in this manner, does not vary largely from year to year, but the index number has risen gradually from an average of 100 in the base period to 119 in the year 1933–34. The average rate of increase is 0·65 per cent. per annum during the period examined. There were two very bad years—1918–19 and 1920–21, and the very low figures in the year 1918–19 may be ascribed to the combination of the failure of the monsoon in that year and the terrible influenza epidemic, which very seriously reduced the available agricultural labour force. Apart from these two years the percentage deviations from the trend are confined within the limits — 10·09 per cent. and + 12·81 per cent. These deviations have been set out in Fig. I.

FIG I. INDEX Nos OF AGRICULTURAL PRODUCTION



Mineral Production.

The next group of statistical series which has been taken into consideration relates to the production of minerals in India. The method of treatment, which I have adopted in this case, is exactly similar to that used in dealing with agricultural production. Index numbers have been formed for the annual production of individual minerals, using the same pre-war five-year base period, and these have been combined into a single index number of mineral production employing weights proportional to the average annual value of the output of each mineral in the base period. A straight-line logarithmic trend has again been fitted to the resulting combined index numbers of mineral production and its equation is :—

log (Index No. of production) = $2{\cdot}13334 + 0{\cdot}01145x$ where $x = 0$ at the year 1921.

TABLE III.

Volume of Mineral Production in India.

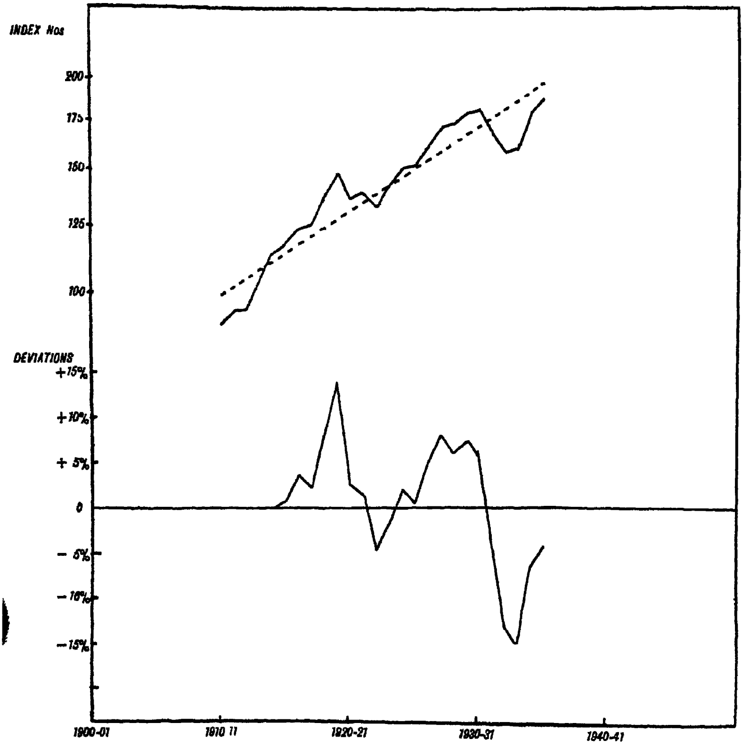
Base (Average 1909–1913) = 100.

	Index No.	Trend.	Deviation.	% Deviation.
Average of 5 years 1909–13.	100			
1914	113	113	0·0	0·0
1915	117	116	+ 1·0	+ 0·86
1916	123	119·2	+ 4·2	+ 3·52
1917	125	122·3	+ 2·7	+ 2·23
1918	136	125·6	+ 10·4	+ 8·27
1919	147	129·0	+ 18·0	+ 13·94
1920	136	132·4	+ 3·6	+ 2·72
1921	138	135·9	+ 2·1	+ 1·54
1922	133	139·5	− 6·5	− 4·65
1923	141	143·3	− 2·3	− 1·60
1924	150	147·1	+ 2·9	+ 1·97
1925	152	151·1	+ 0·9	+ 0·59
1926	162	155·1	+ 6·9	+ 5·02
1927	172	159·2	+ 12·8	+ 8·04
1928	174	163·5	+ 10·5	+ 6·42
1929	180	167·8	+ 12·2	+ 7·26
1930	182	172·3	+ 9·7	+ 5·63
1931	169	176·9	− 7·9	− 4·47
1932	158	181·6	− 23·6	− 13·00
1933	159	186·5	− 27·5	− 14·72
1934	179	191·6	− 12·6	− 6·57
1935	189	196·9	− 7·9	− 4·03

Table III contains the combined index numbers, the trend figures for such numbers, the deviations of the actuals from this trend, and these deviations expressed as percentages of the trend figures. The results have been graphed and are exhibited in Fig. II.

The index is comprehensive for the mineral production of India, and it may be mentioned in passing that the most important individual items are coal, petroleum and manganese, with percentage weights of 50, 20 and 14 respectively, from which it will be seen that all the other minerals together have only a relatively slight effect on the variation of the combined index from year to year. It will be observed that mineral production has shown a continuous increase, apart from the post-war years 1920 and 1922 and during the earlier years of the recent severe depression. The average annual rate of growth over the period examined has been 2·7 per cent., which is very much larger than the corresponding figure for agricultural production. This is only what might be expected in India, where mineral exploitation is of relatively recent growth, while agriculture has been practised there for centuries. The range of deviations from the trend is from −14·72 per cent. in the year 1933 to +13·94 per cent. in 1919.

FIG II INDEX Nos OF MINERAL PRODUCTION



Large-Scale Industrial Production.

The third series which has been examined relates to the physical output of large-scale industries. In India there is, in the aggregate, a large volume of industrial production resulting from the pursuit of what are termed cottage industries. These small industries are carried on in the villages and in the homes of the farmers, and are frequently in the nature of subsidiary occupations taken up during the slack seasons of the agricultural year. One such principal cottage industry is hand-loom weaving, and the importance of this particular small industry in India may be gauged by the fact that the estimate of its annual production works out at about 30 per cent. of the annual production of the large-scale cotton textile mills of the country. This is an estimate made possible on figures of yarn consumption, but in the other small or cottage industries even estimates of the output are extremely difficult to form. The statistics of industrial production which have been examined in this paper relate, therefore, solely to large-scale industries; and even in this field only to those industries for which production figures are readily available. Some important organized industries have already been included under agriculture and minerals, *e.g.*, tea and sugar under the former and coal under the latter. The industries covered by this series are: (1) cotton manufactures, (2) jute manufactures, (3) woollen manufactures, (4) paper, (5) breweries and (6) iron and steel.

Index numbers have been calculated on a three-year base period 1911–12 to 1913–14, for each of the industries, and these individual indices have, as in the previous cases with agriculture and minerals, been combined into an index number of Industrial Production using weights proportional to the average annual value of the output of each industry during the base period. A combined index number series has also been constructed, making use, for the purpose of weights, of the average number of employees in each industry in the base period, and the resulting figures have been included as a matter of interest. These index numbers of industrial production are set forth in Table IV. In this case the materials available cover a longer

TABLE IV.

Index Numbers of Industrial Production in India.

Year.	Index No. Value Weight.	Index No. Employee Weights.	Year.	Index No. Value Weight.	Index No. Employee Weights.
1932–33	160	157	1913–14	103	103
1931–32	160	148	1912–13	104	104
1930–31	149	163	1911–12	93	92
1929–30	162	180	1910–11	92	91
1928–29	137	151	1909–10	95	95
1927–28	156	172	1908–09	85	84
1926–27	149	161	1907–08	85	84
1925–26	136	148	1906–07	81	80
1924–25	137	147	1905–06	80	79
1923–24	120	127	1904–05	73	73
1922–23	120	122	1903–04	70	69
1921–22	116	118	1902–03	67	66
1920–21	122	125	1901–02	65	64
1919–20	120	123	1900–01	51	51
1918–19	114	117	1899–1900	57	55
1917–18	122	125	1898–99	55	54
1916–17	125	127	1897–98	53	52
1915–16	124	127	1896–97	49	48
1914–15	106	108			

period, and the series has been carried back to the beginning of the present century.

The straight line logarithmic trend for the whole period from 1900 onwards is given by the equation log (Index No.) $= 2{\cdot}0269 + 0{\cdot}01310x$, where $x = 0$ at the year 1916. This does not give a very good fit over the whole period, and a second degree function of x on the right-hand side of the equation would probably yield more satisfactory results. Confining the analysis to the period from 1910–11 onwards, the trend equation of the form above works out at:—

log (Index No.) $= 2{\cdot}1112 + 0{\cdot}00921x$ where $x = 0$ at the year 1923.

Table V, set out below, also contains the trend figures given by this equation relating to the shorter period, together with the actual and the percentage deviations from this trend. For the graphic representation of these results Fig. III may be seen.

FIG III INDEX Nos OF INDUSTRIAL PRODUCTIONS

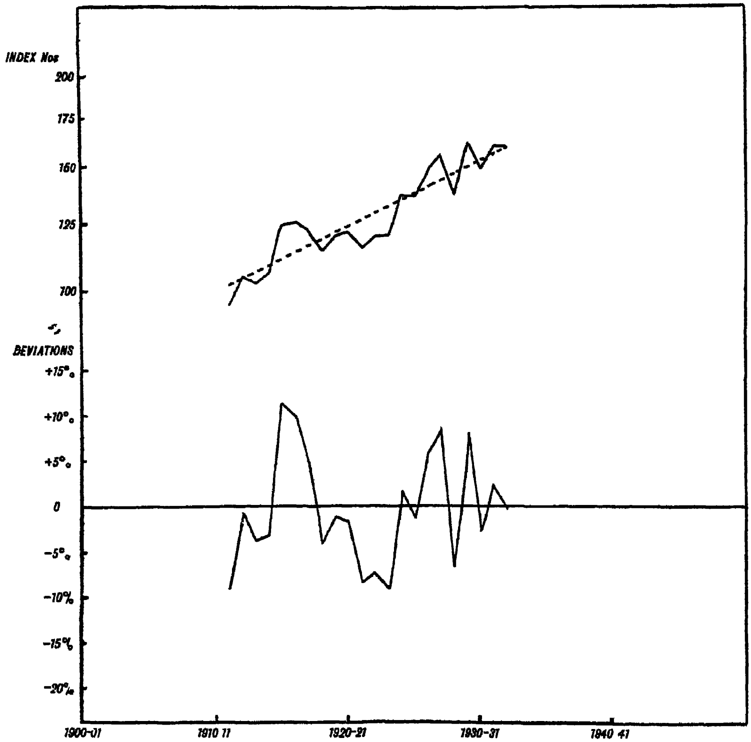


TABLE V.

Index Numbers of Industrial Production in India.

Year	Index No.	Trend.	Deviation	% Deviation.
1911–12	93	102·3	+ 9·3	+ 9·0
1912–13	104	104·5	− 0·5	− 0·48
1913–14	103	106·8	− 3·8	− 3·56
1914–15	106	109·1	− 3·1	− 3·13
1915–16	124	111·4	+ 12·6	+ 11·3
1916–17	125	113·8	+ 11·2	+ 9·85
1917–18	122	116·2	+ 5·8	+ 4·98
1918–19	114	118·7	− 4·7	− 3·96
1919–20	120	121·2	− 1·2	− 0·99
1920–21	122	123·8	− 1·8	− 1·45
1921–22	116	126·5	− 10·5	− 8·30
1922–23	120	129·2	− 9·2	− 7·21
1923–24	120	132·0	− 12·0	− 9·07
1924–25	137	134·8	+ 2·2	+ 1·63
1925–26	136	137·7	− 1·7	− 1·23
1926–27	149	140·6	+ 8·4	+ 5·97
1927–28	156	143·6	+ 12·4	+ 8·63
1928–29	137	146·7	− 9·7	− 6·61
1929–30	162	149·8	+ 12·2	+ 8·15
1930–31	149	153·0	− 4·0	− 2·61
1931–32	160	156·3	+ 3·7	+ 2·37
1932–33	160	159·7	+ 0·3	+ 0·19
1933–34				
1934–35				

Export and Import Trade.

The next group of figures refers to the foreign trade of India, *i.e.*, the exports from India to foreign countries and the imports into India from these countries abroad. For the totals of export trade and import trade we have only value figures, but the usual method of reducing such value figures to volume figures has been followed, viz. by the reduction of each item, as far as this is possible, to the value which it would have had if the base period price had remained constant throughout. These reduced figures have been changed into index numbers on a base of the five pre-war years, and two simple straight lines form trends have been worked out and deviations from these trends measured. The variations from what are called trends are so large that the term seems hardly appropriate, and it might have been better to have taken deviations from a five-year running average. The figures for exports are set out in Table VI, and those for imports in Table VII. In the case of foreign trade also, the period examined extends backward to the beginning of the century. The equation of trend for the index numbers is :—

Index No. exports $= 85{\cdot}2 + 0{\cdot}581x$ where x is zero at the year 1915–16;

TABLE VI.

Index Numbers of Indian Foreign Trade (Exports).

Values reduced to 5 years pre-war price level.

Year.	Exports Rs. (Lakhs).	Index No.	Trend.	Deviation.	% Deviation.
1900–01	118,65	54·6	76·40	− 21·8	− 28·7
1901–02	147,04	67·7	77·09	− 9·4	− 12·2
1902–03	159,90	73·3	77·67	− 4·4	− 5·7
1903–04	201,37	92·5	78·25	+ 14·2	+ 18·1
1904–05	200,14	92·2	78·83	+ 13·4	+ 17·0
1905–06	181,19	83·3	79·42	+ 3·9	+ 4·9
1906–07	171,08	78·8	80·00	− 1·8	− 2·2
1907–08	164,92	76·1	80·58	− 4·5	− 5·6
1908–09	143,09	65·9	81·16	− 15·2	− 18·7
1909–10	195,64	90·2	81·74	+ 8·5	+ 10·4
1910–11	221,39	101·8	82·33	+ 19·5	+ 23·7
1911–12	222,24	102·6	82·91	+ 19·7	+ 23·8
1912–13	228,00	105·2	83·49	+ 21·7	+ 26·0
1913–14	217,79	100·2	84·07	+ 16·1	+ 19·2
1914–15	155,22	71·5	84·65	− 13·1	− 15·5
1915–16	168,94	77·8	85·23	− 7·4	− 8·7
1916–17	201,02	92·6	85·81	+ 6·8	+ 7·9
1917–18	183,22	84·4	86·39	− 2·0	− 2·3
1918–19	154,71	71·3	86·97	− 15·6	− 17·9
1919–20	156,92	72·2	87·55	− 15·3	− 17·5
1920–21	123,29	56·8	88·13	− 31·3	− 35·5
1921–22	126,55	58·3	88·72	− 30·4	− 34·3
1922–23	175,09	80·7	89·30	− 8·6	− 9·6
1923–24	223,86	103·1	89·88	+ 13·2	+ 14·7
1924–25	234,01	107·8	90·46	+ 17·3	+ 19·1
1925–26	228,46	105·3	91·05	+ 14·3	+ 15·7
1926–27	200,77	92·3	91·63	+ 0·7	+ 0·8
1927–28	213,63	98·3	91·21	+ 6·1	+ 6·7
1928–29	211,68	97·5	91·79	+ 5·8	+ 5·9
1929–30	206,26	95·2	92·37	+ 2·8	+ 2·9
1930–31	195,11	89·8	92·96	− 3·2	− 3·6
1931–32	176,45	81·3	93·54	− 12·2	− 15·0
1932–33	159,97	73·6	94·12	− 20·5	− 27·9
1933–34	184,15	84·7	94·70	− 10·0	− 11·8
1934–35	187,55	86·2	95·28	− 9·1	− 10·6
1935–36	188,85	87·1	95·86	− 8·8	− 10·1

and similarly for the index numbers of imports the equation is :—

Index No. imports $= 82{\cdot}3 + 0{\cdot}660x$ where x is zero again at 1915–16.

The rates of growth for the volume of exports and of imports are 0·68 per cent. and 0·80 per cent. per annum over the period from the beginning of the century. Figs. IV and V give the appropriate graphical presentation of the results.

Railway Traffic.

The next set of figures, which have been examined, refer to railway traffic, and the actual statistics used in the calculation are those for

FIG IV INDEX Nos OF FOREIGN TRADE (EXPORTS)

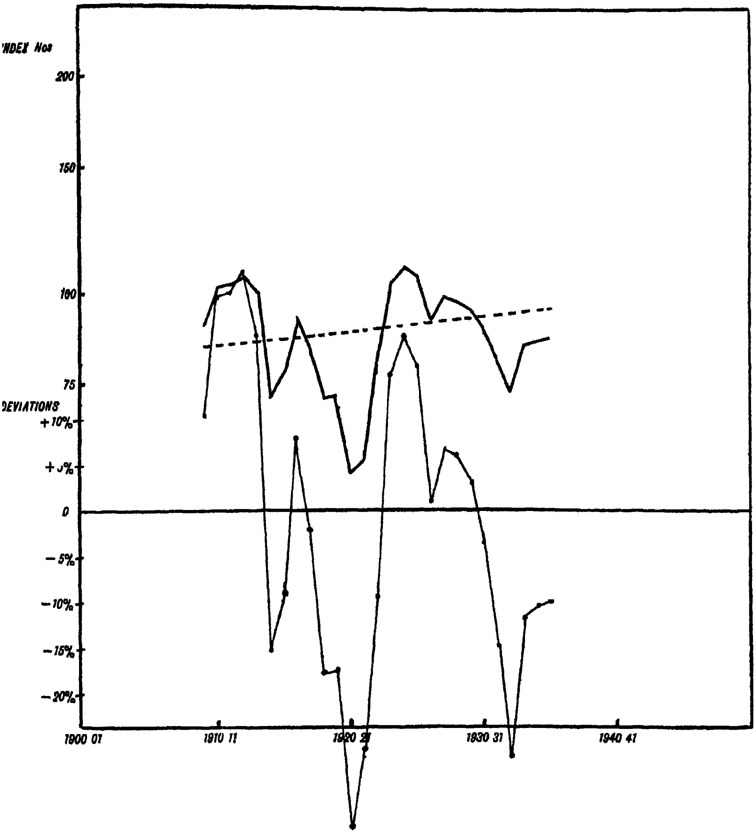


FIG V INDEX Nos OF FOREIGN TRADE (IMPORTS)

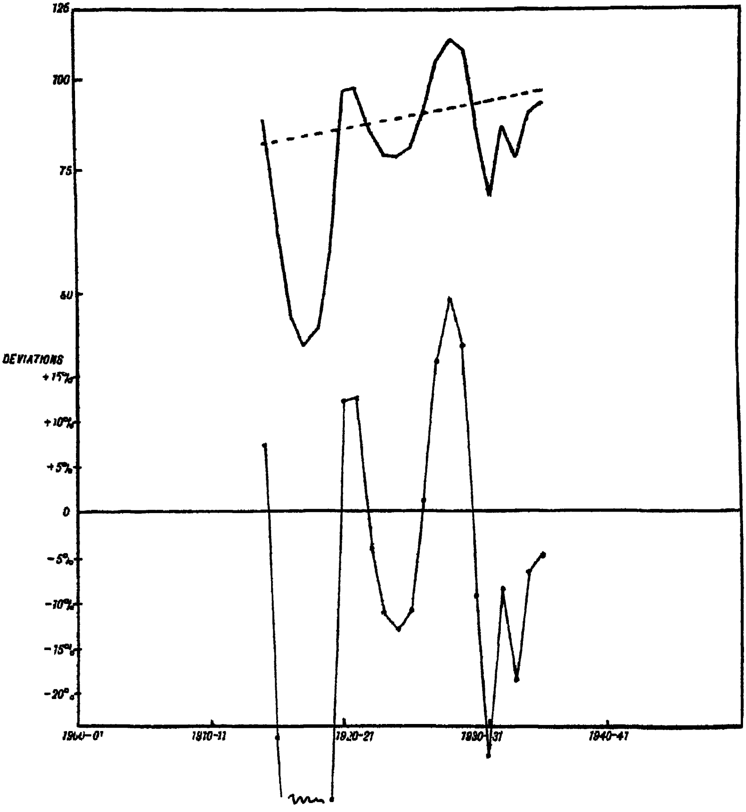


TABLE VII.

Index Numbers of Indian Foreign Trade (Imports).

Values reduced to 5 years pre-war price level.

Year.	Imports. Rs. Lakhs.	Index No.	Trend.	Deviation.	% Deviation.
1914–15	12,782	87·5	81·64	+ 5·9	+ 7·2
1915–16	9,011	61·6	82·30	− 20·7	− 25·1
1916–17	6,847	46·8	82·96	− 36·2	− 43·6
1917–18	6,220	42·5	83·62	− 41·1	− 49·2
1918–19	6,594	45·1	84·28	− 39·2	− 46·5
1919–20	8,363	57·2	84·94	− 27·7	− 32·6
1920–21	14,050	96·0	85·60	+ 10·4	+ 12·1
1921–22	14,173	96·9	86·26	+ 10·6	+ 12·3
1922–23	12,312	84·2	87·92	− 3·7	− 4·2
1923–24	11,541	78·7	88·58	− 9·9	− 11·2
1924–25	11,313	77·4	89·24	− 11·8	− 13·1
1925–26	11,686	79·8	89·90	− 10·1	− 11·2
1926–27	13,400	91·6	90·56	+ 1·0	+ 1·1
1927–28	15,545	106·3	91·22	+ 15·1	+ 16·4
1928–29	16,550	113·2	91·88	+ 21·3	+ 23·2
1929–30	16,017	109·6	92·54	+ 17·1	+ 18·4
1930–31	12,389	84·7	93·20	− 8·5	− 9·1
1931–32	9,918	67·8	93·86	− 26·1	− 27·8
1932–33	12,653	86·5	94·52	− 8·0	− 8·5
1933–34	11,301	77·3	95·18	− 17·9	− 18·8
1934–35	13,073	89·4	95·84	− 6·4	− 6·7
1935–36	13,462	92·0	96·50	− 4·5	− 4·7

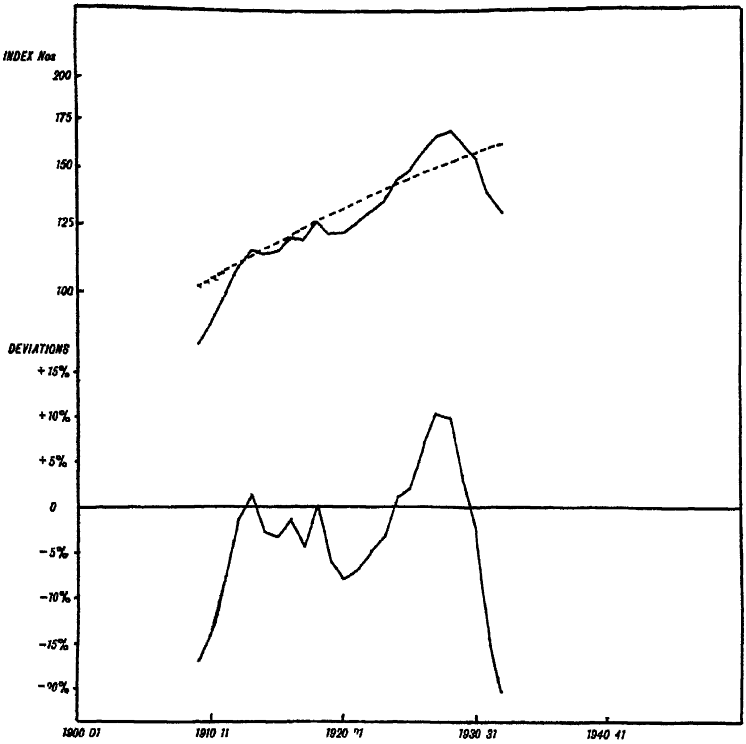
the weight of goods carried by the Indian railways. This description may appear somewhat indefinite, as goods may be carried long or short distances; but from year to year, apart from any sudden change in the nature of transport in India, they can probably be utilized with safety in the measurement of changes in business activity. Figures of gross earnings are also available, and some other railway series; but they do not appear to possess any advantages over the series which has been examined. This is a simple series, and Table VIII, which contains the statistics, is self-explanatory. A straight-line trend has been fitted, the equation to the trend of the index numbers being :—

$$\text{Index No.} = 135 + 2{\cdot}695x \text{ where } x = 0 \text{ at } 1921\text{–}22.$$

The table contains the deviation and percentage deviations of the actuals from the trend figures.

On the trend which has been worked out, the rate of growth in recent years, say, 1930–31 to 1932–33, is about 1·66 per cent. per annum, and during the period examined the range of deviations is from −20·5 per cent. in 1932–33 to +10·4 per cent. in the year 1927–28. The results have been set out graphically in Fig. VI.

FIG VI INDEX Nos OF RAILWAY TRAFFIC



Financial Statistics (Cheque Clearances).

Another important series in the measurement of business activity relates to cheque clearances. In India the habit of using cheques in business transactions has not developed to anything like the degree to which we are accustomed in the United Kingdom; but in the last twenty odd years the practice has become more and more common, and with the rapid expansion of modern banking in that country the use of cheques is becoming much more popular. The figures of the total amount of cheques cleared year by year therefore show a rapid growth, and this is also brought out by the equation to the trend of this growth. In using cheque clearance figures as an index of business activities, as measured by the number of cheque transactions over a period of years, it is desirable, as was the case with export and import value figures, to eliminate changes in the price level during the period. For this purpose the index number of internal prices in India has been used. Table IX contains total

TABLE VIII.

Weight of Goods Carried by the Railways in India.

(In 100,000 tons.)

Year.	Actuals.	Index No.	Trend.	Deviation.	% Deviation.
1909–10	457	85	102·6	− 17·6	− 17·1
1910–11	492	91	105·3	− 14·3	− 13·6
1911–12	534	99	108·0	− 9·0	− 8·3
1912–13	588	109	110·7	− 1·7	− 1·5
1913–14	619	115	113·4	+ 1·6	+ 1·4
1914–15	607	113	116·1	− 3·1	− 2·7
1915–16	619	115	118·8	− 3·8	− 3·2
1916–17	644	120	121·5	− 1·5	− 1·2
1917–18	641	119	124·2	− 5·2	− 4·2
1918–19	684	127	126·9	+ 0·1	+ 0·1
1919–20	657	122	129·6	− 7·6	− 5·9
1920–21	656	122	132·3	− 10·3	− 7·8
1921–22	678	126	135·0	− 9·0	− 6·7
1922–23	703	131	137·7	− 6·6	− 4·8
1923–24	727	135	140·4	− 4·6	− 3·3
1924–25	778	145	143·1	+ 1·9	+ 1·3
1925–26	799	149	145·8	+ 3·2	+ 2·2
1926–27	858	159	148·5	+ 10·5	+ 7·1
1927–28	898	167	151·2	+ 15·8	+ 10·4
1928–29	908	169	153·9	+ 15·1	+ 9·8
1929–30	874	162	156·6	+ 5·4	+ 3·4
1930–31	834	155	159·3	− 4·3	− 2·7
1931–32	746	139	162·0	− 23·0	− 14·2
1932–33	706	131	164·7	− 33·7	− 20·5
1933–34					
1934–35					
1935–36					

values of annual cheque clearances, these values reduced to a basis of the 1914 price level, index numbers of such corrected values, trend figures, deviations and percentage deviations of the actuals from these trend figures. Even when the statistics are modified to eliminate price changes, the year 1920 yields a figure which departs very widely from the general trend. This large deviation was due to the very special circumstances of that year, when trade was booming in India and large individual payments were made for transactions connected with the war. For a long-period trend all years must be included, but for purposes of measuring business activity month by month, at the present time and in recent years, it would probably be more satisfactory to confine the determination of the trend to the later period, from, say, the year 1926 onwards, or, alternatively, to use a five-yearly running average instead of a trend worked out on an assumed form. Figures derived from such an average have been included in Table IX, and the deviations and percentage deviations worked out from these running average figures. The price index number, which has been used for purposes of reduction, does not extend backwards beyond 1914, and so the 1914 reduced figure

TABLE IX.

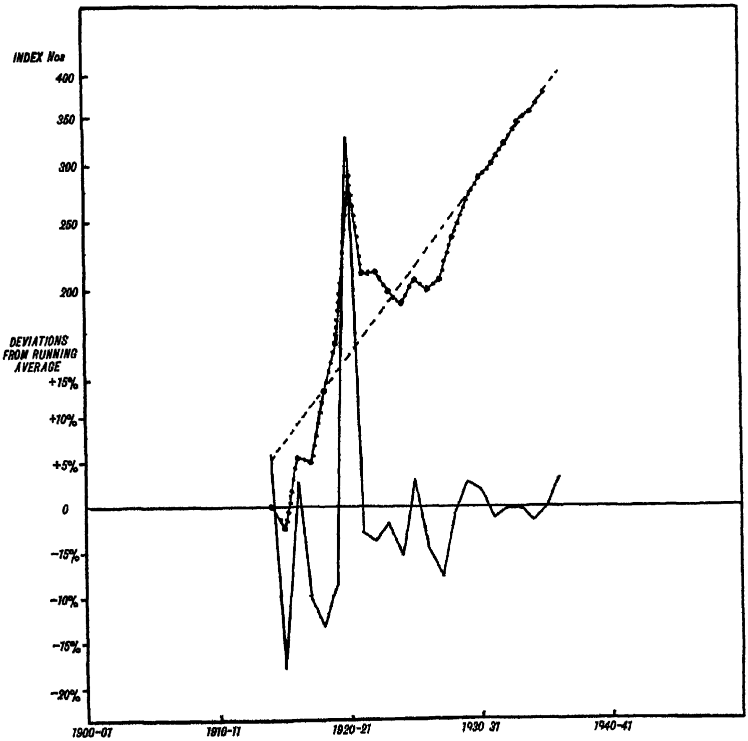
Total Annual Values of Cheque Clearances in India.

(In crores of Rupees.)

Year.	Cheque Clearances.	Corrected Clearances.	Index No. of (3).	Trend of (4).	Deviation of (4) from (5).	% Deviation	Price Index No.	Five Year Average of (4).	Deviation (4) from (9).	% Deviation.
1914	538	538	100	116	− 16	−16·0	100	(106)	+ 6	+ 5·7
1915	563	503	93	123	− 30	−24·4	112	(113)	−20	−17·7
1916	809	632	117	131	− 14	−10·7	128	114	+ 3	+ 2·6
1917	901	621	115	138	− 23	−16·7	145	128	−13	−10·0
1918	1396	784	145	146	− 1	− 0·7	178	167	−22	−13·2
1919	1801	919	170	154	+ 16	+10·4	196	186	−16	− 8·6
1920	3145	1565	290	163	+127	+77·8	201	206	+84	+40·7
1921	2024	1135	211	173	+ 38	+21·9	178	217	− 6	− 2·8
1922	2022	1148	213	183	+ 30	+16·4	176	221	− 8	− 3·6
1923	1856	1079	200	193	+ 7	+ 3·6	172	204	− 4	− 1·9
1924	1778	1028	191	205	− 14	− 6·8	173	202	−11	− 5·4
1925	1770	1113	207	216	− 9	− 4·2	159	201	+ 6	+ 3·0
1926	1592	1076	200	229	− 29	−12·6	148	209	− 9	− 4·3
1927	1649	1114	207	242	− 35	−14·4	148	224	−17	− 7·6
1928	1857	1281	238	256	− 18	− 7·0	145	240	− 2	− 0·8
1929	2038	1445	268	271	− 3	− 1·1	141	261	+ 7	+ 2·7
1930	1804	1555	289	287	+ 2	+ 0·7	116	284	+ 5	+ 1·8
1931	1561	1626	302	303	− 1	− 0·3	96	306	− 4	− 1·3
1932	1577	1733	322	321	+ 1	+ 0·3	91	323	− 1	− 0·3
1933	1620	1862	346	339	+ 7	+ 2·1	87	341	− 5	− 1·5
1934	1708	1919	356	359	− 3	− 0·8	89	(357)	− 1	− 0·3
1935	1860	2044	380	380	0	0	91	(368)	+12	+ 3·3

has been taken as the base in computing the index numbers of corrected cheque clearances. The equation to the trend on the assumed form $\log. c = a + bx$ is $\log (\text{Index No.}) = 2{\cdot}3354 + 0{\cdot}02441x$, where x is zero at the year 1925, and this gives an average annual rate of increase of 5·8 per cent. during the whole period. As none of the other indices, which have been examined, show such a high rate of increase, we have a clear indication, if this is necessary, of the growing popularity of the use of cheques in business transactions in India. The results have been graphed in Fig. VII.

FIG VII INDEX Nos OF CHEQUE CLEARANCES



Combination of the Individual Series.

We have now analysed some of the principal series relating to varying economic activity in India, and in Table X the percentage deviations for each series have been brought together. The problem now is to find some method by which all the results, so far obtained, can be combined to give some single index number which may be regarded as a fair average of the results of the individual series. The various series represent changes in physical quantities as distinct from values, *e g.* in the case of agriculture the series, obtained from a combination of the actual output under each crop, has been taken as a measure of the volume of agricultural production from year to year. The individual series have certainly been brought into combination on a weighting which depended on the relative values of the crops in the base period, but the weighting has not been changed from year to year with changes in the prices of the crops relative to each other. The price factor does not enter into the variations in the series from year to year, and the series is really a measure of the annual changes in agricultural output during the period. For this reason it is no real measure of the changes in agricultural prosperity, as will be seen from the fact that the agricultural production series shows only minor changes in the last few years, whereas the value of this production fell in the same period by almost 50 per cent. Similar remarks regarding the physical character, as opposed to the monetary character, of all the series hold good throughout. The mineral series relates to the actual output of the minerals included in the series; similarly, the industrial series relates to output of the establishments in the industries considered. The railway series rests on the weights of goods carried, and in the case of foreign trade and cheque clearances the variations in the price level from year to year have been eliminated from the value figures which have been used in the calculations. If all these series are combined into one indicator, this indicator can only be regarded as some measure of the economic activity or the business activity in the country from time to time. It will not necessarily be a measure of the business prosperity of India from year to year. It might perhaps be taken as a measure of " occupation " with much more propriety.

The percentages deviations of the six series—(1) agriculture, (2) minerals, (3) industries, (4) foreign trade, (5) railway traffic, and (6) cheque clearances, are contained in Table X, and, as has been said, the problem is to combine these in an appropriate manner. Various methods of proceeding naturally arise. First of all a simple average of the six series may be taken, or the series might be combined on a weighting proportional to the values of the output of each group in some base period, or the first five groups at least might be weighted by the number of people employed in each in the base period. The second and third methods present many difficulties and would depend on a number of estimates which are not free from a considerable degree of uncertainty. But there are certain general considerations which may be of some assistance in arriving at a scale of weighting.

TABLE X.

Combined Index.

Year.	% Deviations.							Combined Index Deviations.
	Agriculture. (10.)	Minerals. (1).	Industries. (1.)	Exports. (1.)	Railways. (3.)	Cheques. (3.)	Imports (1.)	
1914–15	+ 2·4	0·0	− 3·1	−15·5	− 2·7	+ 5·7	+ 7·2	+ 1·08
1915–16	+ 2·6	+ 0·9	+11·3	− 8·7	− 3·2	−17·7	−25·1	− 2·77
1916–17	+ 2·9	+ 3·5	+ 9·8	+ 7·9	− 1·2	+ 2·6	−43·1	+ 5·36
1917–18	+ 3·2	+ 2·2	+ 5·0	− 2·3	− 4·2	−10·0	−49·2	+ 2·06
1918–19	−20·2	+ 8·3	− 4·0	−17·9	+ 0·1	−13·2	−46·5	−15·07
1919–20	+ 6·6	+13·9	− 1·0	−17·5	− 5·9	− 8·6	−32·6	− 0·73
1920–21	−15·6	+ 2·7	− 1·4	−35·5	− 7·8	+40·7	+12·1	− 3·97
1921–22	+ 0·6	+ 1·5	− 8·3	−34·3	− 6·7	− 2·8	+12·3	− 2·57
1922–23	+ 5·4	− 4·6	− 7·2	− 9·6	− 4·8	− 3·6	− 4·2	+ 0·16
1923–24	− 1·7	− 1·6	− 9·1	+14·7	− 3·3	− 1·9	−11·2	− 1·99
1924–25	+ 1·4	+ 2·0	+ 1·6	+19·1	+ 1·3	− 5·4	−13·1	+ 0·57
1925–26	+ 1·6	+ 0·6	− 1·2	+15·7	+ 2·2	+ 3·0	−11·2	+ 1·77
1926–27	+ 1·0	+ 5·0	+ 6·0	+ 0·8	+ 7·1	− 4·3	+ 1·1	+ 1·56
1927–28	− 2·3	+ 8·0	+ 8·6	+ 6·7	+10·4	− 7·6	+16·4	+ 1·21
1928–29	+ 3·3	+ 6·4	− 6·6	+ 5·9	+ 9·8	− 0·8	+23·2	+ 4·44
1929–30	+ 3·3	+ 7·3	+ 8·1	+ 2·9	+ 3·4	+ 2·7	+18·4	+ 4·40
1930–31	+ 3·7	+ 5·6	− 2·6	− 3·6	− 2·7	+ 1·8	− 9·1	+ 1·20
1931–32	− 2·4	− 4·5	+ 2·4	−15·0	−14·2	− 1·3	−27·8	− 5·77
1932–33	+ 0·6	−13·0	+ 0·2	−27·9	−20·5	− 0·3	− 8·5	− 5·28
1933–34	+ 2·6	−14·7		−11·8		− 1·5	−18·8	(− 1·48)
1934–35	−10·1	− 6·6		−10·6		− 0·3	− 6·7	(− 7·85)
1935–36	− 1·3	− 4·0		−10·1		+ 3·3	− 4·7	(− 1·37)

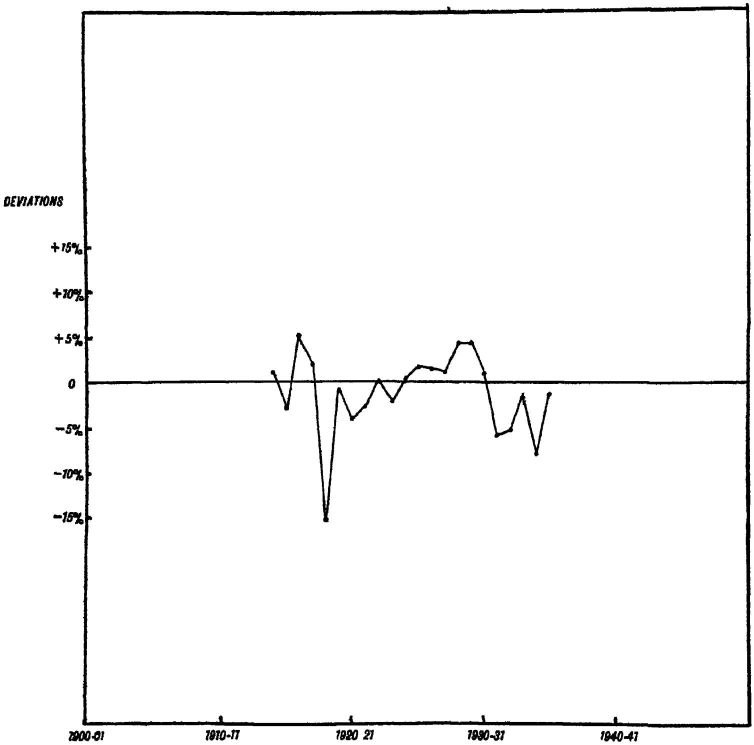
For example, it is well known that from 75 to 80 per cent. of the population in India is, more or less directly, engaged in agriculture, that the internal trade is almost ten times as large as the foreign trade, and that estimates of the relative importance by value in a base period of agriculture and minerals can be made. Another point which has to be remembered is that the six series are by no means independent of each other. This, of course, must be obvious, but it seems difficult to find any method of avoiding this overlapping. For all these and many other reasons the limitations of a combined index must be obvious, and such an index can only be expected to give a very approximate idea of changes in economic activity within the country. In studying such changes it may well be that the examination of the individual series will be more instructive than the examination of a combined average, which depends to such a large extent on what must remain perhaps for all time, somewhat arbitrary decisions.

Although it is impossible to assess accurately the various considerations which have a bearing on the determination of appropriate weights, the following figures have been taken for the purposes of the calculation of a combined index number. The resulting figures are based mainly on the information available regarding the importance of the various spheres of economic activity represented by the individual series.

(1) Agriculture	10
(2) Minerals	1
(3) Industries	1
(4) Foreign trade...	2
(5) Railway traffic	3
(6) Cheque Clearances	3
Total:	20

With these numbers as weights, a combined series of deviations has been calculated, and the resulting figures are presented in the last column of Table X and are graphed in Fig. VIII.

FIG VIII COMBINED INDEX NUMBER



All the series with which we have been dealing are based on annual figures. In order that an index of economic activity may be of immediate use, it must relate to a much shorter time interval than one year; for example, it will be much more useful if it can be calculated from the appropriate data on a monthly, or even in some cases a weekly, basis. When we pass over to, say, a monthly basis, the agricultural figures are not available from the agricultural production series, as it would obviously be incorrect to concentrate the economic activity, represented by the production crop figures of a season's growth, in the particular month in which the harvest happens to fall. The agricultural series therefore disappears from use in a monthly index. All interest in agriculture, however, will not vanish, for the prospects of the crop will influence the external and internal trade, the cheque clearances, and for months after the harvests the character of the year's agricultural activity will be reflected, to some extent, in the other series which are available on a monthly basis. Among the individual series which have been used for the combined index of agricultural production, it will be possible to obtain figures for production of tea and sugar on a monthly basis.

Again, when we come to mineral production we find that the figures of output for some of the minerals are only compiled on a yearly basis; but fortunately monthly figures are available for coal and petroleum, and, as these two minerals account for 70 per cent. of the weighting in the combined index number for mineral production, the absence of the monthly figures for the other minerals is not a matter of such great importance. It might also be possible, without much difficulty, to obtain monthly output figures for manganese, in which case 84 per cent. of the field would be available for the mineral aspect of the calculation.

When we come to large-scale industrial production, we find that monthly data are available for four of the six industries considered earlier in this paper, viz. cotton manufacture, jute manufacture, iron and steel, and paper. The first three of these are far and away the most important industries in India. Further monthly figures of output have become available in recent years for some other industries, such as cement manufacture, matches, flour and some chemicals. The period for which past figures are available for those new additions is very short, and no long-term trend of growth can be worked out at present. Actually the weighting which would be appropriate to the new additions would not be heavy, and their inclusion would probably not affect the combined index number for industrial production to any great extent.

For the remaining three series, viz. foreign trade, railway traffic and cheque clearances, the necessary data are available on a monthly basis.

The usefulness of a monthly index of economic activity depends very largely on the shortness of the interval between the date on which it can be compiled and the end of the month to which it refers. This lag varies widely with the individual series. In some cases, *e.g.* for cheque clearances, railway traffic, coal production, the interval is as short as one week; while in others, such as cotton manufacture, it rises to almost two months. For the majority of the series the necessary information is available about one month after the month under examination. This delay is not serious, and earlier indication of the changes in progress can be obtained from an examination of the individual series which have a shorter time-lag.

This paper only indicates the long-period trends which will require elimination when the calculation of a monthly index is undertaken. In addition to such long-term trends, there is also the question of allowing for seasonal variations. All the series to which reference has been made are subject to very definite seasonal variations, as might naturally be anticipated in the statistics of India, where the whole life of the country is so closely bound up with agriculture, and where the seasons are so definite and so regular. The monthly statistics of foreign trade, railway traffic, cheque clearances are all marked by very definite seasonal variation, and even the variation in the output of large-scale industries, such as jute manufactures and coal mining, indicates quite clearly the time of ploughing and harvesting when numbers of industrial workers slip back to their villages to work in their fields.

I must thank you all most sincerely for the patience and courtesy with which you have listened to this elementary paper. The construction of an index number of economic activity for India would be a new departure, and it is fortunate that we have the present opportunity of receiving expert criticism and advice from the members of the Royal Statistical Society. The difficulties which statisticians in India have to overcome in initiating any new work are very great, and I am sure they will be most grateful to you for your expert guidance in the particular problem which I have indicated.

DISCUSSION ON DR. MEEK'S PAPER.

SIR HARRY LINDSAY: I have great pleasure in proposing a very hearty vote of thanks to Dr. Meek for the paper he has read to us this evening. I had the honour of working with him as a colleague in India, and he succeeded me in charge of the Commercial Intelligence Department. There was this difference between his work and mine, that as Director-General of Commercial Intelligence I was only a consumer, but Dr. Meek was both a producer and a consumer, and since he is an expert on both sides of the account, we owe him much gratitude for his endeavour to solve an extraordinarily difficult problem. In 1929, Sir George Schuster, as Finance Member of the Government of India, was anxious to secure indices of business activity in India, and Dr. Meek has shown us how his calculations were made in response to that request and what results he arrived at.

Some points in the paper struck me as particularly interesting and important. It explodes certain preconceived ideas. I should have thought, for example, that there would have been an enormous amount of fluctuation during the activities of war time, and a gradual lessening afterwards; but not a bit of it. There are a certain number of deviations from trend during the war, but really war conditions do not seem to have affected business activity very seriously.

I commend the trouble which Dr. Meek has taken to weight the different series properly, and I have no criticism at all to offer on them; he has made some extraordinarily good shots—for he will agree with me, I am sure, that he could not do more than make shots. The weights seem to me to be very helpful and to produce the right results.

I should like, if I may, to criticize one point. I am a little doubtful whether the railways and cheque clearances really help us in this estimate of business activity. Railway clearances, of course, do show transport activity, but transport activity may be traced either to imports or to exports or to local industrial or agricultural production, and when it is remembered that only about one acre in eleven in India is providing agricultural produce for export, all the rest being locally consumed, agricultural production must have a fairly important effect upon railway transport. It is not at all unlikely that the popularity of the railway, which increases every year, would tend to take away traffic from humbler forms of conveyance; while, *per contra*, diminished popularity (in favour, perhaps, of motor transport) would tend to produce an artificial fall in the number of railway clearances. It is impossible to give a weight which would correct either of these two tendencies, but I think one must be careful in applying railway transport as an indication of business activity. It is the same with cheque clearances. There is, of course, an increasing volume of debts being liquidated by means of cheques; they take the place of the old divided currency notes. To the extent to which cheque clearances are merely displacing older methods of liquidation of claims, Dr. Meek's statistics tend, perhaps, to give an exaggerated account of business activity in that particular field.

Another point is this. Could Dr. Meek, instead of weighting agricultural production as he has done, show this production under two or possibly three main heads? I should like to suggest that plantation products are likely to fall under laws rather different from the laws which govern other agricultural production, and therefore merit a special number of their own. I think that materials should be available for a group comprising tea, coffee and rubber, and possibly the sugar factories, unless the sugar factories should appear under industrial production. After the plantation products have been deducted, I think the field products might be divided between food crops and industrial material crops. Thus linseed would probably be an industrial material; cotton and jute certainly would be. That subdivision might give a clearer conception of what are certainly different lines of production within the agricultural sphere.

What are we really after? To arrive in the end at a single trend with deviations for all business activity in India is really most useful when a curve of that kind can be produced for comparison with other countries producing curves on similar lines. So far as India or a single country is concerned, we ought really to stop at what might be called a national examination of these various tendencies, leaving them in their different groups so that it would be possible to compare one group with another; and of course from the point of view of successful comparison, the steepness of the trend in each of the groups is enormously important.

One additional argument on this subject. An increase of agricultural production will tend to result in a fall in prices, and that fall in prices may result in cheaper materials, say, for the cotton industry or other manufacturing industries. In other words, the two groups, industrial and agricultural, are very closely linked, and the disabilities of the one may tend to fortify the other. Is it just possible that a satisfactory solution would be found in a comparison of the volume of output with a price curve to accompany it? The two would correct each other, and the result would be to show whether an increase in production had really meant an increase of gross income to the producers.

Dr. Snow: I am very glad to have this opportunity of following Sir Harry Lindsay in expressing our appreciation to Dr. Meek for the paper he has given us to-night.

There are two ways of discussing this particular paper; one is to consider some of the facts with which it deals, and the other to consider some of the methods he uses for analysing those facts. I should like to make some references to the facts. I am particularly interested in Tables IV and V, which deal with the growth of industrial production in India. It will be seen from the figures how extraordinarily rapid has been that growth. From a figure of 49 in 1896 it has gone up to 160 in 1932–33.

It is unfortunate that it is only possible to give the figures of production for a few large industries, because the growth of smaller industries in India has been particularly prominent in recent years. The growth of the sports goods industry in India, for example, has been almost dramatically rapid. It is not many years ago that an Indian student over here was so much impressed with the possibilities of establishing this industry in India, that after some training here he returned to India and began to manufacture sports goods. There is now a substantial town in India producing only sports goods. Many thousands of Kipling's "muddied oafs" in this country who play football on Saturdays play with a ball manufactured in India from the hides of Indian cattle; many thousands of the "flannelled fools" who play our national summer game play with a ball made in India, and thousands more play tennis with racquets made in India from Indian materials. The interesting thing is that nobody knows the actual imports of these goods from India; practically all come in by parcel post, and the trade returns of neither country give particulars of imports or exports by parcel post. As both Mr. Leak and Dr. Meek, who are present to-night, may be able to influence official procedure in this matter I should be failing in my duty if I did not ask them both to try to publish more information in future regarding the imports and exports between the two countries by parcel post.

Next to the figures of industrial production, I am particularly interested in the figures of India's foreign trade. Dr. Meek has corrected these for change in prices, but even so they show some striking changes over the period. The most prominent feature, to my mind, is the difference between the movements in India's external trade as a whole, compared with the movements in India's trade with this country in recent years. If Tables VI and VII are taken together, thus giving the balance of trade in merchandise of India as a whole for the last ten years, it will be seen that there was a considerable excess of exports over imports of merchandise from India. The figure for the latest years of the period is practically the same as the figure for the first three years of the decade. The balance of merchandise trade of India as a whole has not changed very much. Looking at the corresponding figures for trade with this country alone, however, a striking difference is noted, a difference which few people in this country appreciate. We used to be very large exporters to India, with a considerable excess of exports over imports. But over the last three years we have had an excess of imports over exports of £8 million per annum. Going back ten years, the trade was in the other direction, with an excess of £20 million of exports. As for the reasons for the change, I think the deliberations at Ottawa in 1932 had a considerable responsibility for it, though this is not the place to discuss that matter. There have, of course, been some other important changes in India's external balance of payments; but speaking of merchandise trade, I know of nothing so striking in the whole of the international trade figures as the turn-over in the trade of this country and India in the last decade.

I should like to make one remark on the method used by Dr. Meek. I am not sure that Dr. Meek will not meet with a certain amount of criticism as to the use of the term "trend" in this particular paper. The term "trend" has a fairly common usage as a *curve* of growth. Dr. Meek has used it as an indication of the *average* rate of increase over a period. An "average" has a distinctly significant meaning, but it has not the same meaning as that which statisticians have given by usage to the term "trend." Take the figures for imports in Table VII; it is quite clear that the curve of growth of imports is not a straight line at all, but a curve of ups and downs. I should have thought that it would have been better to have taken the five-year moving average in such a case in order to get an indication of "trend." A curve obtained in this way obviously fits the facts better than does Dr. Meek's assumption of straight-line growth.

The analysis in the paper brings out clearly some of the pitfalls met with in trying to combine indices for individual series into a general index. It can be done more or less accurately if the series all follow straight-line trends. But if the trends do not follow straight-line laws, there is an obvious fallacy in combining them. For example, indices exist of the level of the tide at, say, the mouths of the Thames, the Severn and the Mersey. Suppose we wished to get some sort of an index for the tides round our coasts as a whole, and combined these three indices. Actually when we had done so we should have gone far to destroy the tides in the resultant curve, because when the individual index for the Thames is near its maximum, that for the Mersey is in the neighbourhood of its minimum. Unless account is taken of the time-lag, a result of no significance at all is obtained, and personally I feel very dubious as to the statistical propriety of combining indices in the manner which has now become fairly popular, not merely in Dr. Meek's paper, but in other places.

I now formally second the vote of thanks to Dr. Meek proposed by Sir Harry Lindsay.

(The Vote of Thanks was put to the Meeting and carried unanimously.)

Mr. Leak said that in compiling an index number of this kind it was most important that all the series should, so far as possible, be reasonably accurate, and he would like to say a few words about the index numbers of foreign trade on p. 376. These represented the volume of imports and exports estimated at the average values of the five pre-war years. He very much distrusted index numbers of overseas trade estimated on the prices of so remote a period, and that mistrust was shared by the Conference of British Commonwealth Statisticians, which met at Ottawa eighteen months ago. The Conference then made a definite recommendation that index numbers of this kind should be revised preferably at intervals of not more than five years. Even over five years there were liable to be very large deviations—he had recently found for imported manufactures one of 9 per cent.—and it would not surprise him in the least to find that the index numbers mentioned here for India were quite as much out. With imports of cotton piece-goods going down from 30 to 12 per cent. of the total imports, and with imported raw cotton 10 times as much as before, there were bound to be enormous discrepancies in the index numbers for India, and it was only by having a series weighted as one went on, and changing the base from time to time that it was possible to get anything reasonably accurate.

Mr. Leak was rather doubtful about that particular series, and was also a little doubtful about some of the others. To take cheque clearings, for example, there were in this country four series of Bank clearings, but although the Bankers' Clearing House did not say so, the figures which they published were not continuous; in fact, he had discovered a discontinuity of 3 per cent. which they did not mention, and there might be causes in India similar to those operating in this country. That particular discontinuity was due to certain inter-Bank transactions being settled on a gross instead of on a net basis, and there might be something of that kind in India. Also, Banks had their own internal clearings between their own branches. On the amalgamation of two banks, clearings which were external became internal, thus affecting the figures. He did not know if there was anything of that kind in India, but if so, it should be brought out, and it was a matter worth looking into. Was it right to correct that series by what was stated to be the internal prices of India but which appeared to him to be the series of wholesale prices at Calcutta? Even if the right corrector was a wholesale price index, about which he was very doubtful, why select Calcutta prices in preference to Bombay prices, for which the price series was quite different?

Dr. Meek explained the very large deviation of 40 per cent. in the cheque clearing series for 1920, partly by there being a trade boom in that year. Exports had got the largest deviation below their assumed trend in that particular year and agricultural production nearly the largest, which hardly looked like a trade boom. Was it not possible that the reason for the large upward deviation in the cheque clearing series was due to the price corrector not being accurate in that particular year, when prices rose rapidly, and then fell abruptly? Possibly taking them monthly would have given a better fit.

With regard to the equation of trend for the weight of goods carried by railways in India, given on p. 379, the equation would be more accurate if the index number for the year 1921–22 were 133 instead of 135. Practically all the deviations were negative, and Mr. Leak would suggest that possibly that might need a little looking into. Most of the deviations in respect of the import index numbers were also negative, but that might possibly result from the trend having been taken from the beginning of the century instead of over the period given by Dr. Meek in the paper.

MR. CRUMP said he was very glad indeed to have the opportunity of associating himself with the vote of thanks passed to Dr. Meek for his paper.

He understood from what Dr. Meek had said that he was seeking for guidance from Fellows of the Society, and while feeling that in many respects they ought to be seeking for guidance from Dr. Meek, he would do his best to make one or two suggestions in response to his appeal. His first comment would be that India was a very diverse country. Diverse in the character and contour of its areas and in its population, with their many races and religions; and in seeking a single index for the whole, Dr. Meek had taken on a very difficult job.

The second point was that he was not happy about trying to combine agriculture and industry in one general figure. Dr. Meek mentioned one important point on page 384, when he said that the value of the agricultural production fell in the same period by almost 50 per cent. That was a very common difference between agriculture and industry, that a depression mainly affected the *prices* of agricultural products, while in industry it more affected the *volume of output* and *employment*. Because of this fundamental difference it seemed dangerous to combine the two in a single index.

One or two other points had been covered by Mr. Leak—in particular, the one about cheque clearings. First of all there was this enormously rapid upward trend of clearings, due to the growth of the banking habit, and, again, Mr. Crump was a little nervous about bringing in a series which was rising so steeply. While the banking habit had extended, he doubted if it had yet gone far enough. The cheque was not in general use in India as it was in this country, and he doubted if it ever would be. The case of an amalgamation between two banks had been mentioned. The banking system in this country was as simple as A B C, compared to that of India. In England there was the Central Bank at the apex, the clearing banks next, and then the public; but in India, if one started with the Bank of India, and went right down through the Exchange Banks and large indigenous banks to the village moneylenders, there was a very complex system. For that reason no one could tell exactly what money the Bank Clearing system tapped, and how much it left untapped. Until that was known, he would be very reluctant to incorporate this figure in a general series.

Mr. Crump finally made one or two suggestions which he hoped would be helpful. First that it might be better not to begin by considering India as one single area, and trying to construct one single index figure. Next that agriculture and industry should be considered separately, and only after much experience should there be any thought of marrying them together. In agriculture one could work on one set of data, including prices and returns of income from agriculture. In industry one could work on another set—the number of mills and number of people employed.

These were indications of the sort of things Mr. Crump had in mind. What he really wanted was to deprecate an attempt to produce one general index, but instead, to suggest that local indices should be worked out for particular phases of local activity. These suggestions in no way discounted Dr. Meek's pioneer undertaking, which was, after all, the first step forward on a work which was very important for the well-being of India.

Mr. Macrosty said that praise of work by so eminent an authority as Dr. Meek was unnecessary and he hoped he was satisfied with the constructive criticism for which he had asked. The one comment he would make was that there was no linear trend in Figures IV, V, and VII, and that the general index was impaired by their incorporation.

Dr. Meek, replying, said: Many of the criticisms made I am very grateful to have received; most of them I expected, but in one direction I should have liked a little more help if that had been possible. If we are going to marry these two weights together, I should have liked some guidance as to the importance which should be attached to each of these series. That to me is one of the main problems, but unfortunately this problem has not been dealt with by any of the speakers.

However, I can assure you that the criticism I have received will be extremely useful to the people we have left in India to carry on this type of work.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society.—

John Henry Buchi.
Alexander Gross
P N Harvey, F I A.
G James Joyce
Puthenveetil Chandapilla Mathew.
Aly Hassan el Ramli

Corporate representatives:

Shawn Maturin Cox, *representing* Messrs James A Jobling and Company, Ltd

James Llefelys Davies, *representing* the Milk Marketing Board.

ON THE VALUE OF ROYAL COMMISSIONS IN SOCIOLOGICAL RESEARCH, WITH SPECIAL REFERENCE TO THE BIRTH-RATE.

[A Discussion before the Royal Statistical Society, on Tuesday, April 20th, 1937, the Rt. Hon. LORD KENNET, P.C., G.B.E., D.S.O., D.S.C., in the Chair.]

PROFESSOR M. GREENWOOD, F.R.S.

THE unbroken succession of sunrises and sunsets has been the statistical excuse for many illogical applications of a principle which, as Professor R. A. Fisher has pointed out, Bayes himself probably did not believe to be true; more legitimately it has been the object of humble imitation by the Council of our Society. Without consulting Mr. Macrosty, I cannot be sure that a century ago the Society met on the third Tuesday of the month from November to June. But even during the War lapses from regularity were rare; in peace, within living memory, they have not occurred. There is no peace-time precedent for failure to perform our statistical rites on the third Tuesday of the month (from November to June). Nobody knows what might be the result of failure. A Bye-Law suggests that the consequences to one or more of the Honorary Officers might be extremely grave. The Council have always recoiled with horror from the risk.

But sometimes, the last occasion was fifteen years ago, a gulf does open in the statistical forum and a Curtius is required. The original Curtius was a noble youth, but, owing to the declining birth-rate, youths, noble or plebeian, are scarce. It is hoped that the cheaper sacrifice of an ex-president may be a sufficient propitiation.

The propitiatory ritual followed on the last occasion was that Curtius, having made a number of remarks calculated to provoke some or all of the audience, should leap into the gulf amid a storm of execration. My recollection is that too many of the audience approved Curtius' heresies for the expiation to be quite satisfactory. To-day the auspices may be more favourable.

The Times recently printed two letters the signatures of which awakened in me pleasant memories, for the writer was Sir James Marchant, and I recalled many profitable hours spent in his company more than twenty years ago. If I now use his letters for ritual purposes, I am sure he will forgive me. Sir James was pleading earnestly for the setting up of a Royal Commission to investigate the population question, and concluded an eloquent appeal by expressing the belief that if the Prime Minister established such a

Commission, he would "merit the benediction of posterity." Other less eloquent correspondents endorsed the plea.

Eloquent as were Sir James's letters, much as I relish Reports of Royal Commissions (or even of Departmental Committees) on pedagogic grounds, I did have some doubts as to what precisely this Royal Commission was expected to do. To investigate? To advertise? To inspire? Or to command? I could not myself answer these questions, and thought that, by displaying my own ignorance, I might stimulate some learned fellows, or even more learned visitors, to explain in a little more detail the precise reasons posterity will have for pronouncing a benediction upon the nominator of another Royal Commission.

Sir James Marchant did not enter into statistical detail—rightly, of course: the leading-article page of *The Times* is reserved for higher uses. But he did, I thought, imply that some authors he mentioned had made new and important contributions to our statistical knowledge of the declining birth-rate and its consequences. Sir James was, of course, aware—has indeed pointed out in other writings—that the fall of the birth-rate and its consequences for the age constitution, as well as size of our population, had not escaped the notice of official statisticians. Indeed, since the beginning of the twentieth century, official comments upon one or other aspect of the phenomenon have appeared with almost monotonous regularity in the publications of the General Register Office. But it is true that these comments have lacked colour and vivacity. Thus, in the General Report on the Census of 1911 a survey ends with the tolerably explicit but cautious remark: "These fluctuations are not without importance in their bearing upon the probable future proportion in our population of workers at the most economically efficient ages, and especially upon the supply of recruits to the military service in future years" (Gen. Report, p. 62). Our official statisticians may have speculated on the demographic prospects of A.D. 2011 or even 2111, but they have refrained from printing these extrapolations. Numerous unofficial writers have been bolder. We may admire their courage, but, before we praise their ingenuity, we might pay a tribute to the work of the distinguished mathematician who made these arithmetical exercises possible. I refer to Dr. A. J. Lotka. I suppose that the idea of calculating how many persons will try to stand in the shoes of an existing generation when that generation has been gathered to its fathers must have occurred to many statisticians. But, so far as I know, the first statistician to solve the problem generally was Lotka. Lotka* showed that the answer depended upon the solution of an integral equation, which he obtained. He also showed how a simple arithmetical method would give an approximately correct answer. In collaboration with Dr. L. I. Dublin,* he illustrated the arithmetical process on American data, twelve years ago. Three years ago, Mr. C. D. Rich published a lucid study of Lotka's methods in the *Journal of the Institute of Actuaries* (*J.I.A.*, 1934, lxv, 38–77), so it is a little odd that the name of Lotka has so seldom a place in English books. I suggest that if professional statisticians have refrained from long-distance extrapolations, it has not been because they were ignorant of the arithmetical technique, but simply because they doubted the value of voyaging into a remote future. I can find nothing in the rather numerous popular and semi-popular works published during the last few years to make me believe that serious investigators need the encouragement or advice of newspapers or even Royal Commissioners.

---

* See, *inter alia*, Lotka, *Proc. Nat. Acad. Sciences*, 1922, **8**, p. 339; *J. Washington Acad. Sci.* 1925, **15**, 469; *Amer. J. Hygiene*, 1928, **8**, 875; *Human Biology*, 1931, **3**, 459.

I am, of course, old-fashioned, and have never grown out of a belief that the scientific investigators who are worth their salt try to solve problems because they are interested in the problems, and for no other reason. I remember an article by Professor Karl Pearson—it was, I think, contributed to a supplement of the old *Encyclopadia Britannica* issued by *The Times* some thirty years ago—in which he expressed that point of view with his usual force. Scientific investigators, like other men, need food and shelter, even some of the minor luxuries of life. Should it chance that, in satisfying their curiosity, they incidentally discover things useful to their fellow-creatures, there is no reason why "the State" should not, unostentatiously, contribute to their maintenance. But the flood-lighting of research has always seemed to me a sterilizing process. There are, within and without the public service, a small number of intelligent persons genuinely interested in demography. They would indubitably continue their studies with just as much keenness if the very phrase Declining Birth-Rate were as rigorously taboo in England as the name of the poet Heine in Germany. They cannot be encouraged by hoarse shouting through megaphones. Give them a common meeting-ground for discussion and opportunities to publish their results, and they will be happy and efficient. Our Society does much in this way. No doubt if the State made us a grant for publications we could do a little more. But if the price of such help were to conduct our meetings under the glare of massed searchlights, we should, I hope, decline it. The normal course of scientific investigation is—in private. The practice of Isaac as described in the eighteenth and following verses of *Genesis* cap. xxvi, is, and always will be, the line of conduct of what I call a real researcher. But the advocates of a Royal Commission hope for something more than additions to scientific knowledge—they hope to stir the national emotions. Let us consider what a Royal Commission *can* do.

---

* Dublin and Lotka, *J. Amer. Stat. Ass.*, 1925, **20**, 305; *Metron*, 1930, **8**, 107.

I think I am right in supposing that the essential distinction between a Royal Commission and a Departmental or Inter-Departmental Committee is one of prestige. Membership of a Departmental Committee *may* be confined to persons whose sole qualification is that they understand the subject referred to them. Members of a Royal Commission *may* understand the subject upon which they are to report, but they *must*—or at least a majority must—be persons whose names can be found in *Who's Who.* This requirement is usually expressed by the phrase that the names must command public confidence. The proviso has three useful results, applicable to *all* Royal Commissions.

(1) It gives a pleasant sense of civic worth to a number of elderly persons without regular employment.

(2) It saves the time of those civil servants who draft answers to parliamentary questions. Many honourable members can be persuaded to await answers until the Royal Commission has reported.

(3) It stimulates the employment of typists, stenographers and printers.

These are good but not wholly sufficient reasons for the encouragement of Royal Commission making.

There are some subjects wholly suitable for treatment by Royal Commission. The reform of a university is an instance. One has an important but relatively narrow issue which rarely now excites political prejudice—too few voters are interested—and most of the commissioners are sure to be both competent and keen. The three post-war Royal Commissions on the Universities of Oxford, Cambridge and London seem to me good instances of the success of the method. I do not, of course, mean that the conclusions reached were necessarily sound, but that they did command approval, and were speedily implemented. Here three desiderata are fulfilled: (1) The subject is, comparatively, narrow. (2) Those most directly affected do read and understand the report. (3) Few or no political difficulties stand in the way of giving legislative effect to the findings.

On the other hand, of course, a reasonably narrow and well-defined issue, if it excites acute political feeling, is likely to have no Commissionable merits, other than those enumerated above as common to all Royal Commissions. It would be unkind to cite examples, and unnecessary. We all know several. I pass to wide issues, relating to subjects which *may* involve legislation in the long run, but are at a stage when no political party will commit itself. The subjects referred to the Dominions Royal Commission and to the Royal Commission on the Poor Laws—merely to name Commissions parts of whose reports I have studied—belong to this class. I suggest that the value of the reports of those Commissions was great, but mainly indirect. The reports were of educational value directly to administrators and intelligent Members of Parliament. But they made no appeal whatever to the man in the street. Him they reached indirectly, through his college tutors or university professors. He was better taught than he would have been if the Commissions had never been appointed.

I suggest that the subject of the birth-rate very clearly falls within the class of wide issues; I think, but with less complete confidence, that it does not yet excite violent political animosities. Therefore I believe that a Royal Commission might compile a report of indirect value. Assuming that the members whose names commanded public confidence were tactful enough to leave the actual work to an obscure minority (mostly civil servants), only reserving to themselves any public credit the final result might obtain, I have little doubt that the report (with appendices) would at least be of value to those of us who earn our livings by academic teaching. But I do see a very wide distinction between this case and that of the Dominions or the Poor Laws. There it was a question of changes, administrative and legislative, in which acquiescence rather than active co-operation was required from those finally involved. Here it is a question of the vivid realization by those concerned of a general danger, and their individual co-operation in dispelling it. Even if the Commissioners refrained from the examination of half the faddists in the country lusting to express " views," their report could not be a document easily read between London Bridge and Brighton. It would inevitably be a long, solid document. How would it be received? On the day of publication, *The Times* would print a good summary and an appreciative leading article. The less Olympian papers would be content with slogans—Civilization at the Cross Roads—Commission's Grave Warning—with inset portrait of the Chairman (if a peer). There would be a few letters in the Sunday papers, a few questions in the House; possibly a debate on the motion for adjournment. Then the Report would die; like the works of *Pictor Ignotus*, surely, gently die, to rise again (fractionally) in professorial lectures or in answers to questions set by Mr. Macrosty in university examinations.

There is indeed one way in which this fate might be averted.

> "Do you see this square old yellow Book, I toss
> I' the air and catch again, and twirl about
> By the crumpled vellum covers—pure crude fact?"

That yellow (not blue) book *was* changed into something which moved the hearts of thousands; but not without effort.

> "From the book, yes; thence bit by bit I dug
> The lingot truth, that memorable day,
> Assayed and knew my piecemeal gain was gold—
> Yes; but from something else surpassing that,
> Something of mine which, mixed up with the mass,
> Made it bear hammer and be firm to file."

Without doubt a Chatham, a Burke or even a Gladstone, might transmute the blue book's elements of pure crude fact into the gold of an appeal which might charm a whole people. But, and I draw near to the moment of leaping into the gulf and leaving solid ground for the use of more intelligent persons, what we need is not a sufficiency of pure crude fact, but an alchemist. Put a Chatham or a Burke in Downing Street, and he will not need to wait for a thousand folio pages of a Commission's report. One intelligent private secretary could in one week provide him with enough material for all his alchemy.

> "Erras meorum fur avare librorum,
> Fieri poetam posse qui putas tanto,
> Scriptura quanti constat et tomus vilis:
> Non sex paratur aut decem sophos nummis."

We do not lack arms, but the man. He will not be found in the plural unity of a Royal Commission.

PROFESSOR A. M. CARR-SAUNDERS: All those who received a notice of this meeting must have recognized what an admirable subject had been set for discussion, very pertinent to the interests of the Society, very relevant to the topics of the day and, moreover, of extraordinarily wide general interest. Royal Commissions and Departmental Committees are a characteristic social mechanism of this country, and now that other countries seem to be inclined to copy this mechanism, it is only appropriate that it should be examined in the country of its origin. It is sometimes said that the government of this country does not assist the study of the social sciences as it assists that of the natural sciences, but I would suggest that the reports of Royal Commissions are in fact a sort of concealed subsidy to teachers, and greatly lighten their burden.

The question for discussion to-day—namely, the circumstances in which this machinery should be used—seems to presuppose some agreement as to the object for which Royal Commissions are instituted.

They are not set up to perform academic exercises; they are appointed when a specific economic or political problem has emerged for which a solution is sought. They are not primarily fact-finding bodies and they cannot accomplish their main task of giving advice unless a survey of the situation has already been made. Commissions have to answer two questions in respect of the matter before them: (1) Should action be taken? (2) If so, what action? If, therefore, the circumstances are such that the report of a Commission is unlikely to stimulate or to mould action, a Commission is waste of time. If, for example, the matter is already the subject of acute political controversy, the Report of the Commission will be ineffective.

Professor Greenwood has said that if three desiderata were secured the Royal Commission would be effective, in the sense that the report would be considered and perhaps implemented. This seems to me to be correct, but when he goes on to speak of a special case when the reference given to a Commission is wide, I feel myself in some doubt as to the conclusion which he seems to draw. It is true that the wider the reference the less likely is action to follow soon, and this is a reason for limiting the reference as far as possible. Nevertheless there are questions which cannot be considered in part, and action can never be rapid where many interests are touched. But, provided a report of a Royal Commission is not calculated to delay action and does, in fact, ultimately mould it, it may be justified in those fields, though it should be sparingly used.

There is, however, another aspect of this matter to which I should like to draw attention. The use of the mechanism cannot be justified merely on the ground that it promotes some action. It is only appropriate when circumstances are such that a Commission can obtain and use the relevant evidence which it must have before it can advise. Relevant evidence can roughly be divided into fact and opinion. As to the former, the Commission is in a strong position for collecting such data as are already available and for taking note of any analysis of such data. But it is another matter when the facts are unknown, or when, for lack partly of time, partly of machinery, analysis has not been complete. It will then be ineffective for lack of expert assistance in obtaining and handling the data. A situation may well arise where by general consent there is a problem needing solution concerning which the facts are inadequately known or insufficiently analysed. Can nothing be done except to wait until the gap has been filled in the ordinary course of investigation? I suggest that in such circumstances the Government might make a precedent by enlisting the help of the Universities for investigating the conditions. An example might be the conditions of industrial depression.

I want to make the point that in the circumstances mentioned some procedure for ascertaining and examining relevant facts seems to be required. When it is a matter of obtaining information a Commission is well situated to call help from those with expert knowledge. Such information may be expert, or it may come from one speaking for a group, such as a representative putting forward the opinion of the Church on lottery or betting. It may also be desirable to obtain representative opinion from ordinary members of the Community, but here a Commission is no better situated than any other body or person; it may be obliged to listen to self-appointed witnesses.

Our knowledge on this subject of birth-rate is at present very meagre. We know something about the reproduction rates for the whole country, but nothing regarding the various occupational groups. The need is for further examination of the existing data; there is some need for additional data which a Commission is not fitted to collect. It can do little more than summarize what has already been summarized. This is not a field in which there is much expert opinion to be had; there are few persons qualified or experienced to say that a particular course of action will yield certain demographic results. On the other hand, there are plenty of persons ready to proffer opinions which probably it would be better for the Commission not to hear.

I present these considerations which, if varied, morally reinforce the more important arguments which Professor Greenwood has brought against the proposal for a Royal Commission on the Birth-Rate. But a time might come when a Royal Commission might be of service. Suppose the birth-rate continued to decline, that the facts had been exhaustively examined, and that, owing to concentration of attention on all the aspects, expert information were available; then a Commission might be of use in preparing the way for action, even though its terms of reference would necessarily be widely drawn.

In conclusion, may I thank Professor Greenwood for his address and for mentioning Dr. Lotka, whose name should be prominent on such an occasion as this.

PROFESSOR R. A. FISHER: The all-too-short comments which Professor Greenwood has given us as the basis for discussion leave me in some doubt as to what he thinks ought to be done. I feel that all of us must agree with his general point of view that a merely fact-finding Royal Commission on the birth-rate would be ineffective and, indeed, rather ludicrous in view of the series of researches which have clarified the situation, not only in this country, but abroad, during the last fifteen years. Professor Greenwood has particularly mentioned Lotka, and has enquired why references in English writings to his work have been comparatively few. It is a little odd that the name of Lotka has no place in English books. I suggest that the reason must lie in the period at which his work was carried on. The dates I see here are 1922–25, and those of us who can recall the state of English opinion at those dates will remember also the researches, such as those of Professor Bowley, carrying out rather similar calculations or, if you like, predictions, of the size and nature of the British population, by methods which were as accurate as those of Lotka. Even before Bowley we can remember that Brownlee, a few years after the War, was forming the same conclusions on grounds now generally accepted. I think that those earlier writers were addressing a generation totally unwilling to believe that such a thing as under-population, or a damagingly decreasing population was a possible contingency, and psychologically I think we can understand why that was. The men of weight and opinion in our councils, as well as in the Councils of State, had been brought up and formed their opinions in the eighties and nineties of the last century, when the demographic situation was entirely different from that which Northern Europe has seen since the War. They were thinking in Malthusian terms, and we need only recall such successful propaganda of a Malthusian character as appeared in the British press under the names of Harold Cox and the former Dean of St. Paul's, to know how very widely English public opinion had been impressed with the illusory danger of over-population, and a fear that social legislation should contribute to over-population. I remember it being argued that our population was increasing so rapidly that British shipping would be totally incapable of removing the surplus of emigrants, even if there were countries able and willing to receive them.

I wonder whether Dr. Greenwood has sufficiently taken account of the fact that propaganda is a two-edged weapon. While no research worker has need of propaganda, he may well find the result of his work frustrated by a misinformed public opinion which is under a totally wrong impression of the situation with which it is faced. Between the pure scientist producing pure crude fact, and the man of genius of Professor Greenwood's last sentence, " We do not lack arms, but the man," is there not a middle term? Is there not something we can put between the remote secluded philosopher and the little Mussolini who will certainly put his opinions across whether they are right or wrong.

I have read Sir James Marchant's letters, and I think his point was that we need not the accumulation of known facts but an opportunity for the framing of a policy to face facts already pretty well understood. One further point was very prominent in Sir James's letters, and that was anxiety as to the quality of population. Looking round Europe, one will see that anxiety about quality differs from concern as to the way in which a sufficient quantity can be secured. When one looks at the policy now recently adopted in Germany and Italy, of producing children of any kind, at all costs, one feels that a pause for reflection on this matter might be well worth our while.

Sir Arthur MacNalty said he had not intended to speak, but had come to the meeting to learn. He would, however, like to say with what interest he had listened to Professor Greenwood's opening address and to the two following speeches.

On the question at issue as to the advisability of a Royal Commission with special reference to the Birth-Rate, he would like to point out that there were instances of Royal Commissions, other than those mentioned by Professor Greenwood, which had been followed by prompt and efficient action. The Royal Commission on Venereal Diseases, for instance, was followed immediately by action on the part of the Government. Here of course there was a very narrow field of enquiry. There were two kinds of Royal

Commission, or two methods on which Royal Commissions worked. There were those which heard witnesses, collated evidence and made recommendations based on the data considered; there was also the kind of Royal Commission that, besides acting on the lines already mentioned, initiated scientific research into the matter of their terms of reference. The best example of that was the Royal Commission on Tuberculosis, which decided the question of the harmfulness of bovine tubercle bacilli to man. That Commission lasted for a good many years and had a team of research workers working at the problem. A declining birth-rate was a very complex problem and an enquiry into its chief factors would take years. He, therefore, sympathized with what Professor Carr-Saunders had said about the need for collecting data on the subject beforehand.

Not being a statistician, Sir Arthur was not qualified to join in the chorus of praise for the work of Dr. Lotka, but he would urge that mathematicians worked from a basis of static premises while the problem of declining population might not be a static problem. In conclusion, he apologized for the fragmentary nature of his remarks and expressed his appreciation of the invitation to take part in the discussion.

MR. R. B. KERR said he was in favour of a Royal Commission; one of the strongest arguments in its favour was that it was a means of sweeping away a great deal of intellectual rubbish. There were always erroneous ideas going about, sometimes from eminent quarters. For example, they were often told that the population of the United Kingdom was declining, whereas in point of fact it was not merely fairly rapidly increasing, but at the present time the amount of the increase was itself increasing. In 1934 the increase was 149,000, and in 1935 the increase was 205,000, while in 1936 this increase was 214,000.

Another valuable use of a Royal Commission was to bring out forgotten factors. Recent literature on birth control entirely ignored the factor of immigration. The net immigration year by year into this country was now very considerable, and was likely to remain considerable.

A Royal Commission might discuss the question of emigration overseas beginning again. In Mr. Kerr's opinion it would never begin again to any great extent, because Great Britain had a higher standard of life than continental Europe or the Irish Free State, and there would always be a tendency for migration towards countries where a comparatively high standard of life could be maintained. These were illustrations of the kind of thing that a Royal Commission could bring out.

MR. S. P. VIVIAN had hoped that they would have had an exposition of the case for a Royal Commision on the birth-rate by some of those who originated the proposal, but in their absence he had had to turn to the published expressions of their views.

Those who favoured a Royal Commission did not usually seem to have analysed the nature of the problem which it would have to face.

Those few who appreciated what the problem was did not appear to relate that knowledge in any way to their recommendations. The author of a long letter in *The Times* pressing for a Royal Commission stated clearly that the question was whether anything could be done to check the decline of the birth-rate and to induce it to take an upward turn. But he then answered this question with his own conclusion that the only solution was a revival of the individual will to procreation, and he not unnaturally reasoned that a Royal Commission could not materially contribute to this object. Upon his own showing, therefore, he left the utility of the Royal Commission which he proposed somewhat blown upon. He did, it was true, refer to some contingent propaganda value, but at the present time the gentlemen of the Press were securing for the birth-rate question, and the prospects of a decline of population, an amount of publicity which would leave a Royal Commission standing. It was true that the Press did not always speak with one voice, but neither, as a matter of experience, did Royal Commissions.

One spoke of a birth-rate and population *problem*, and rightly. What was this problem? To answer this question it was necessary first to analyse the component elements in the situation.

First, there was no problem about the present position. The birth-rate was below a replacement rate, and unless it chose or was induced to take an upward turn, a decline of population must occur sooner or later. No exercise of mathematical or statistical expertise could add to the existing stock of fact. There was no need for a Royal Commission on this matter, and if further forecasts were needed, there were statisticians available to make them.

The remaining considerations depended upon the answer to the question: Is the nation to be active or passive in the face of this problem? If people folded their hands and waited for the inevitable, whatever it might be, then, if the inevitable proved to be a decline, it would be good statesmanship to have prepared in advance for its reactions upon the social, industrial and economic organization. But the prior question was clearly whether an active attitude was at all possible. And upon this depended, as he saw it, all questions of values—which was best for the nation, an increasing, a declining or a stable population, and what the optimum population was. It was useless to determine what population they ought to have if there were no means of promoting its realization. Here were the cross-roads. They came back to the common-sense practical problem—could anything be done to stay the decline or induce the birth-rate to take an upward direction? This was the real and only *problem*. Other countries in Europe had made administrative attempts to promote the birth-rate, so far with no remarkable success. The real problem was whether it was possible to influence the birth-rate by any positive action. For this purpose one must know whether the birth-rate was at all responsive to conditions or stimuli which could be made the basis of any plan of action in the present circumstances, and this in turn involved the question of what conditions encouraged larger rather than smaller families. As yet there was no information on this large and vital subject, and no Royal Commission would be able to obtain any. On the subject of the value of Royal Commissions in general he would like to draw a distinction between an enquiry into a matter of opinion and an enquiry into a matter of fact. Such questions as what was the best form of University constitution or the best form of Poor Law administration were clearly matters of opinion. What was necessary was to obtain, digest, and select from the experience and opinions of the persons of good judgment who were conversant with those subjects. But the birth-rate problem was not a question of opinion in the sense described, but was a question of fact, since it depended upon whether the birth-rate was in fact susceptible to any practicable form of encouragement.

A Royal Commission had, he believed, the power of compelling witnesses to attend. So far as related to witnesses testifying to their own views and their own prescriptions, there would be no need for the exercise of those powers, but when such a Commission desired to summon a witness who could testify as to the facts of the central problem, not even a Dictator could produce him. There was no such person, since there were no such statistics.

Mr. Vivian did not think that this was fully realized by those who sought to promote a Royal Commission. He did not think that they appreciated that no Royal Commission upon its appointment could fail to encounter this central problem, and that no such Commission would have any alternative but to look the problem in the face and pass by on the other side, busying itself with the incidental matters and fringes, while leaving the central problem strictly alone. He did not fancy that the members of a Royal Commission, faced with this experience, would feel that their lot was a very happy one, and he felt it to be desirable that this should be realized before the appointment of a Royal Commission rather than afterwards.

Whether and at what future stage the time might prove to be ripe for the general examination of the whole matter according to deliberative procedure by a Royal Commission or some similar body, he did not know, but he was personally convinced that an initial period of research was essential before that could happen, and that the field of the new evidence required must first be experimentally investigated, with a view to building up, if possible, a body of statistics which would elucidate the real central problem. This alone would determine the question which, he felt sure, was indirectly or subconsciously troubling many deeply interested people—whether they *could* be active or *must* be passive in the face of this new portent.

Lord Kennet said he would like to interpose in this most interesting discussion, and if any special thing had brought him to his feet contrary to his wont, it was the feeling of a parent, because he stood in a quasi-paternal relationship to a certain number of Royal Commissions, and with these feelings still fairly active in his heart, he could not listen to the rather slighting words of Professor Major Greenwood upon, at any rate the genera, if not the species of his offspring, without a certain amount of reaction.

Of course he quite agreed that if one analysed these offspring there were not only the legitimate but also the illegitimate, and he would never for a moment suggest that all Royal Commissions were equally legitimate.

He would like to detain the meeting with a few remarks on the natural history of Royal Commissions. It was known to all that the functions of the Governors of a democracy were very largely the functions of a medicine man. They had to distract the attention of democracy as a whole from really vital matters by displays calculated to keep them happily occupied—a function in which they received the greatest and most constant assistance from the press. Anyone who, like himself, was a superficial student of anthropology, would know that one of the favourite devices of the medicine man was a tribal dance, and in order to persuade his tribe that something very important was going on in the way of activity, he would put up a dance in the middle of the tribal circle. That was the first function of a Royal Commission—a tribal dance to persuade the general public to believe that something very active was in progress. A continued study of the ways of the medicine man would bring out another device—the medicine hut. This was a hut shrouded by curtains, into which he retired for a long period with the object of persuading the tribe that something very important was going on and that it was essential that they should wait for his emergence. This was the second function, and both were totally illegitimate.

There was a third function, even more illegitimate, and that was the promotion of the dog-fight. When a Government finds itself extremely hard put to it to distract the attention of the public from one of the fundamental human ills for which the public expects a remedy from the Government, and for which the Government is sorry it can find no remedy, it promotes a dog-fight between the people with different views, and for starting a dog-fight there is no method so valuable as that of a Royal Commission.

He would make one further observation upon the natural history of a Royal Commission. Like other drugs (if he might be allowed to change the metaphor), if it were to be used efficiently, it must be used sparingly, or it became exhausted in its effect. He had known Governments, of which he had himself been a humble member, which had made too great a use of the dope of a Royal Commission, with the consequence that it lost its effect. He had indeed known a time when a self-denying ordinance had to be passed by a succeeding Government that no further Royal Commissions should be set up, because the name had become a matter for derision. No Government more deserved the hatred of its successors than one which exhausted the use of this valuable method of distracting the attention of the public.

The Royal Commission had its legitimate uses also. There was the purpose of ascertaining facts, and there was the purpose of ascertaining methods. In the course of the present discussion they had considerably limited the applicability of this legitimate use of the Royal Commission to the population question.

Another purpose which could be legitimately served by a Royal Commission was to discover the deep underlying abysses of public opinion upon subjects of general interest when there had not hitherto been an adequate opportunity for exposing those abysses. When some important new question turned up, on which people at large had not had an opportunity of expressing or forming an opinion, the Royal Commission provided a forum for the formation of opinion, or at any rate for the ascertainment of opinion, and this might be a useful function. The instance that came into his mind in this connection was that of the sterilization of the unfit. The formation of a national programme on that subject would have to be effected in two steps; the first step would be the ascertainment of facts by Departmental officials, and the second would have to be some grand inquest in the nature of a Royal Commission to ascertain what the state of the national conscience of the public might be in relation to the matter.

With regard to the subject of population, it would appear that there was one possible function of a Commission which might be discharged with usefulness, and that was to state the case for and against increase or reduction of the population. One so often saw it assumed—and it had been decidedly assumed by some speakers that afternoon—that the fall of the birth-rate would be a national disaster, while others were not prepared to accept that as a self-evident proposition. There could be a powerful contention that the increase of the population of this country had been based upon an economic system in which Great Britain was the principal industrial workshop of the civilized world, and that it could not be maintained at that high figure now that that position had been lost, without a strain which would reduce the general sum of human happiness below what it would be with a much smaller population. That question was not easy to answer.

With regard to the other circumstances to which the Registrar-General had referred, Lord Kennet was inclined to agree with him that there was not likely to be any practical result from a Royal Commission in the region of biology, as to whether it was possible to be active or passive. But there was another purpose that might usefully be served by such an enquiry, and that was to provide the public, including that part of the public engaged in governing the rest, with definite information as to what the probable future of the population was to be. There were differences of opinion on this matter. He had seen it commonly assumed amongst the uninstructed and half-instructed that the population was going to fall. Was that so? He could remember only four years ago speaking in a responsible assembly about the basis of a policy, and someone ventured to suggest that the policy should be prepared on the assumption that population would not grow, and the suggestion was greeted with derision. It was said by people of long experience but not particularly acquainted with these matters that they were not disposed to speak decisively, because "it always came right with nature"—a population always recovered itself. But if they were to prepare their policy on a firm basis for the future, he was inclined to think that this was a legitimate occasion for a Royal Commission.

Another function of a Royal Commission was to act as part of the method of government. He agreed with what was said by one speaker of the tragic waste of fine work put into these enquiries, imprisoned in the sterilizing blue-book, and shot into the forgotten pigeon-hole. How often in the course of public life had one come across serious, practical workers in the administration and legislation of government, engaged upon some problem, laboriously working at it with their own very limited resources of time, and all the while had they been put on to the right source they would have found all the information they required already provided. That was a deplorable waste in connection with the publications of Government and Royal Societies, and at present there was absolutely no method or organization for making use of them. He had sometimes wondered whether some organization might not be provided: he had even dreamed of some method based on the principle of the Public Accounts Committee, a Committee which after the House of Commons had sanctioned all the Estimates, took the audited accounts of expenditure and reported to the House the results of its examination. Might it not be possible in this imperfect world to see that there should be some Committee of the House of Commons that would have for its function and consideration all the reports of Commissions and Committees, and whose function it would be to prepare highly concentrated statements for the benefit of the House of Commons and others, on the lines of action advised, and who might even be given an opportunity for bringing these matters before the House of Commons in a special report as to what they, as a business Committee, thought might practically be carried out in the way of legislation or administration as the result of these reports? He thought something of the sort might be done, and the personnel for it would be found in the unoccupied back-bench Members who would be only too delighted to find some such use for their time.

MR. FRANK HILL said that he would strongly welcome a Royal Commission on this subject because he felt that a nation's children constituted its most valuable asset. A Royal Commission might also suggest improvements in the registration laws, such as that ages of parents should be recorded when the birth of a child was registered.

Reference had been made to enquiries by civil servants, but it would be better if municipal officials, such as health visitors and Medical Officers of Health, were added, for they were the men up against the real problem.

DR. E. C. RHODES supported the last speaker on a particular point in reference to the collection of more statistics relating to fertility. One of the chief difficulties to which Mr. Carr-Saunders and Mr. Vivian had referred was the lack of statistics. In the now well-known Special Memorandum of the London and Cambridge Economic Surveys, No. 40, the figures on which the estimates of future population were based, some had been borrowed from Sweden, on account of lack of information relating to those matters in this country. How far a Royal Commission on the Birth-Rate would be able to influence future legislation he did not know, but it was conceivable that if the Royal Commission found they could not answer the problem because they had no statistics, the result might be a recommendation that the proper machinery should be set up in order that the statistics needed should be collected and made available.

MR. D. V. GLASS said that, speaking as one of the small group of people engaged in research on the population question in Great Britain, he did not think that any of these people were concerned merely at the thought of a fall in our numbers. The only reason for concern was the possibility that this fall might be continuous. Lord Kennet had rather put the cart before the horse when he mentioned the desirability of a Royal Commission getting the public to decide whether they wanted the population to increase or fall. A Royal Commission set up for this purpose would only be of value when we knew something of the reason why our population was likely to fall in the future. The most urgent problem for study was therefore that of the decline of fertility in the last sixty years. To tackle this question three methods of approach were possible. First, experimentally, a method which was not likely to be adopted. Secondly, directly, by enquiring of people why they were restricting the size of their families, and in surveys of this type the answers were all too frequently rationalizations. Thirdly, indirectly, by analysing the causal connections between series of phenomena associated with the decline in fertility. It seemed likely that this method would produce the best results. If this were the case it was difficult to see what help a Royal Commission could give the enquiry. What was most needed was a thorough revision of the system of registration in this country, so as to provide researchers with adequate vital statistics. Such a revision had been promised for the near future. Probably, the most satisfactory method of investigating the whole problem would be in close collaboration with the General Register Office in this country. Certainly a Royal Commission, the main function of which was to collect data already in existence, though not easily available, could do very little to help in the kind of investigation which was needed. For this reason Mr. Glass was very gratified by the remarks of Professor Greenwood on the subject.

DR. SNOW said that Professor Greenwood had made reference in his opening remarks to the Dominions Royal Commission, and it might be of interest to recall that that Commission gave considerable attention to one aspect of the problem of population, though not directly to the birth-rate. The Commission investigated very thoroughly the question of the numbers of the population of this country available for emigration. All sorts of opinions had been put before the Commission. Mr. Harold Cox said that in his opinion the aim should be to emigrate from this country at least half a million people every year. Mr. John Burns said that in his opinion no attempt should be made to migrate more than three hundred thousand a year. Between all the opinions given the Commission was a little confused, and decided to have a statistical investigation undertaken. For this purpose they appointed a statistician and also had the assistance of a Committee of this Society. The conclusion reached was that there were practically no males available for emigration if it were desired to maintain the numbers of the population in this country, under the age of 45. It appeared at that time, however, that some emigration of females might be encouraged without a seriously adverse effect upon the future population. The War intervened, and the Commission's report was forgotten, but, as the juvenile statistician responsible for some of the estimates, Dr. Snow said that he would like here—twenty-five years afterwards—to retract them. Measured against the bold forecasts of the present generation of juvenile statisticians they were feeble efforts—nothing beyond 1941 was attempted—but he had now lived long enough to know that they would be falsified through the great change which had occurred in recent years in the influence of migration upon the population of this country. There had been a complete change over. Before the War the average net emigration a year was about 100,000. In the three years prior to the sitting of the Commission it had gone up to as much as 300,000. For the ten years between 1921 and 1931 the net *emigration* averaged 80,000 a year, but since 1931 there had been a complete change. For the last six years there had actually been a net *immigration* into this country averaging 65,000 per year.

The question was what was likely to be the course for the future? In many recent discussions concerning the birth-rate there had been great confusion of thought between "population" and "birth-rate." The change from being an emigrating country to being an immigrating one might have a much greater effect than the change in our birth-rate on the *total* population of this country. He thought that those taking part in public discussions of the very serious effects of the falling birth-rate would be on very much safer ground if they confined their future estimates of population to those under 20 years of age or thereabouts. Estimates of the population under 20 in 10 years time, or even 20, could be made with substantial reliability and the results were startling enough. But when figures of estimates of the total population at all ages were quoted for distant dates—28 millions in 1976 and 5 millions in 2035 seemed to be those most frequently quoted in the popular press—they were weakening their case by having to defend estimates into which the speculative element very largely entered. He did not challenge the arithmetic which led to those results, but he strongly held the view that the hypotheses on which they were based would be falsified by events. He thought there would be substantial immigration into this country when—within another generation—the age distribution became very much more distorted. The great change which was occurring in the age distribution was the chief problem upon which he considered economists should concentrate. Some present would remember a meeting in that room eight years ago, when an economist said that he disagreed more than with anything he had heard before with the doctrine that changes in the number and age distribution of the population were of great importance in national economic welfare;

he repeated the view not uncommon at that time that the only thing that mattered was the way the money went round. Some practical business men, at any rate, had found that it was necessary to get behind the money factor and to study population problems, since the change in the age distribution was having a vital influence on some industries.

PROFESSOR GREENWOOD, in reply, said: I think I might fairly confine myself to saying, with Prospero, "our revels now are ended"; the ritual has been carried out, the meeting on the third Tuesday held and a grave danger averted. The witch-doctor need dance no more.

But a mere man having the last word at his command is always weak enough to use it.

First, let me be statistical and pause at a remark made by Sir Arthur MacNalty, who said that "Mathematicians worked from a basis of static premises while the problem of declining population might not be a static problem." It is the crowning merit of Lotka that he did *not* confine himself to the static, but formulated and solved the dynamic problem which is the kernel of the population difficulty regarded statistically. To make forecasts of population on the basis of existing or extrapolated rates of mortality and natality is within the competence of any man possessed of a quire of paper, a table of logarithms, a calculating machine, a few blue books and plenty of patience. The estimates which have been published by so many statisticians using patient, brute arithmetic are reasonable, but anybody who did this sort of thing (I am, of course, speaking for myself and people like myself not gifted with innate analytical powers) before reading Lotka was conscious that he *was* working statically, that he had not a grasp of the dynamics of the problem. Lotka—whose researches in this field cover a period of more than a quarter of a century—clearly formulated and solved the dynamic problems. As a mere amateur of mathematics I do not presume to set myself up as a critic of methodology, but a comparison of Lotka's writings with the work of so eminent an investigator and teacher as Blaschke * will, I think, convince any reader of Lotka's superiority. Blaschke's handling of the dynamic theory of population growth was purely formal, at places almost trivial, and added little to theoretical and nothing to practical knowledge. Lotka gave a new direction to those interested in theory and new tools to those who wished to make arithmetical studies. I do not think it creditable to English writers that his work has been so largely ignored; I hope that this discussion may make some very tardy amends. At least my own students are left in no doubt as to whom I consider to be the real population expert in the statistical field!

Passing from the statistical to the general topic, I must frankly confess that Professor Fisher's summary of my state of mind is just. He does not know what I think ought to be done; I do not know either. I *think* I think that when a subject acquires news value

---

* See *Giornale di Matematica Finanziaria*, Vol. VI, 1924, pp. 57-103.

—and the population question has surely done that—the moment has come for people like me to begin to take an interest in something else. There is no lack of very able people who, so soon as they perceive that something can be made of a particular line of investigation, that it will either have commercial applications or, as in this case, may influence public policy, are quite willing to take an active interest in it. When that stage has been reached, merely inquisitive people, like me, are moved to look for some still unpopular object of curiosity. We are the pilot-fish "*reputed* to act as a guide to the shark" (I quote the Shorter Oxford English Dictionary faithfully, but italicize the first word). I gather from the discussion that there is division of opinion whether the time has come for a mobilization of sharks. The majority think it has not, and some speakers are not even sure that the pilot-fish are very safe pilots. I dare say they are right. If so, we may still look forward to quiet and intellectually stimulating discussions among ourselves.

As a result of the ballot taken during the meeting the candidates named below were elected Fellows of the Society :—

Henry Brown.
Harold John Chater.
Hugh Gosschalk.
S. Subramonia Iyer.
Michael Shapiro.

Corporate representative :

Frank Edmund Wilson, *representing* The Anglo-Saxon Petroleum Company, Ltd.

MISCELLANEA.

CONTENTS.

PAGE

The Frequency Distribution of the Difference between Two Independent Variates following the same Poisson Distribution. By J. O. IRWIN, Sc.D., D.Sc. 415

A Note on Inverse Probability. By JAN WIŚNIEWSKI 417

On Pareto's Law. By C. BRESCIANI-TURRONI 421

THE FREQUENCY DISTRIBUTION OF THE DIFFERENCE BETWEEN TWO INDEPENDENT VARIATES FOLLOWING THE SAME POISSON DISTRIBUTION.

By J. O. IRWIN, Sc.D., D.Sc.

LET m be the mean of a Poisson distribution, then for two independent variates thus distributed the chance that the first variate has the value x_1 and the second x_2 is

$$\frac{e^{-2m}m^{x_1+x_2}}{x_1!\,x_2!}\quad (x_1, x_2 \text{ positive integers or zero}).$$

Let $x_2 = x_1 + d$.

Then the joint distribution of x_1 and d is

$$\frac{e^{-2m}m^{2x_1+d}}{x_1!\,(x_1+d)!}$$

Hence the distribution of d is

$$\sum_{x_1=0}^{\infty}\frac{e^{-2m}m^{2x_1+d}}{x_1!\,(x_1+d)!} = e^{-2m}I_d(2m). \quad . \quad . \quad . \quad (1)$$

where d can take all integral values from $-\infty$ to ∞. $I_d(2m)$ is, of course, Bessel's modified function of the first kind of order d and argument $(2m)$.

It is known that for large values of $(2m)$

$$e^{-2m}I_d(2m) \sim$$

$$\frac{1}{(4\pi m)^{\frac{1}{2}}}\left[1+\sum_{r=1}^{\infty}(-1)^r\frac{\{4d^2-1^2\}\{4d^2-3^2\}\ldots\{4d^2-(2r-1)^2\}}{r!\,2^{3r}(2m)^r}\right]$$

If d is also large being of order $\sqrt{2m}$ we have:

$$e^{-2m}I_d(2m) \sim \frac{1}{(4\pi m)^{\frac{1}{2}}}\left[1+\sum_{r=1}^{\infty}\frac{(-1)^r}{r!}\left(\frac{d^2}{4m}\right)^r\right]$$

$$\sim \frac{1}{(4\pi m)^{\frac{1}{2}}}e^{-\frac{d^2}{4m}} \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

and the approach to normality is clear, the variance being of course $2m$.

Calculation of Semi-Variants.

The distribution (1) has the interesting property that all its even semi-invariants are equal, the odd ones being zero. Its moment-generating function is given by :

$$M = e^{-2m} \sum_{d=-\infty}^{\infty} e^{ad} \left\{ \frac{m^d}{d\,!} + \frac{m^{d+2}}{1\,!\,(d+1)\,!} + \frac{m^{d+4}}{2\,!\,(d+2)\,!} + \ldots \right\}$$

$$= e^{-2m} \sum_{v=0}^{\infty} \frac{m^v}{v\,!} \left\{ e^{v\alpha} + v e^{(v-2)\alpha} + \frac{v(v-1)}{2\,!} e^{(v-4)\alpha} + \ldots + e^{-v\alpha} \right\}$$

$$= e^{-2m} \sum_{v=0}^{\infty} \frac{m^v}{v\,!} \{e^{\alpha} + e^{-\alpha}\}^v$$

$$= \exp. \left[-2m + m(e^{\alpha} + e^{-\alpha})\right] \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

Hence the semi-invariant generating function is given by :

$$K = \log M = -2m + m(e^{\alpha} + e^{-\alpha})$$

$$= 2m\left[\frac{\alpha^2}{2\,!} + \frac{\alpha^4}{4\,!} + \ldots\right] \quad . \quad . \quad . \quad (4)$$

Hence all the even semi-invariants of the distribution are equal to $2m$, the odd ones being zero. The fourth moment is given by :

$$\mu_4 = 3(2m)^2 + 2m \quad . \quad . \quad . \quad . \quad . \quad . \quad (5)$$

and Pearson's β_2 by :

$$\beta_2 = 3 + \frac{1}{2m} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (6)$$

so that the approach to normality is rapid.

A NOTE ON INVERSE PROBABILITY.

By JAN WIŚNIEWSKI.

§ 1. IN part I, vol. XCIX, of the *Journal of the Royal Statistical Society* we find a short paper on "Inverse Probability" by L. Isserlis (pp. 130–137). To the present writer the most interesting part of it is that dealing with the inversion of Chebyshev's inequality and the interpretation of such inversions.[*]

May I be permitted first to recall some points of the paper referred to? Chebyshev's inequality is given in the following form:[†]

$$P\{|p-p'|<t\sqrt{pq/n'}\}\geqslant 1-\frac{1}{t^2}\frac{n-n'}{n-1}\quad .\quad .\quad (A)$$

which is consequently reversed into the other form:

$$P\left\{\left|p-p'+\frac{(p'-\frac{1}{2})t^2/n'}{1+t^2/n'}\right|<\frac{t/\sqrt{n'}}{1+t^2/n'}\sqrt{p'q'+\frac{t^2}{4n'}}\right\}\geqslant$$

$$\geqslant 1-\frac{1}{t^2}\frac{n-n'}{n-1}\quad .\quad .\quad .\quad (B)$$

p meaning the probability in the parent population, p' the proportion of success in the sample, $q=1-p$, $q'=1-p'$, n and n' are numbers of units in the population and in the sample respectively, t is an arbitrary positive number and $P\{Z\}$ denotes the probability of an event Z. To (B) the following interpretation is given: "This gives the probability that p should be between certain limits when p' is known—showing that Fisher's pessimism[‡] was unjustified."

§ 2. What is the meaning of such inversions of inequalities as from (A) to (B), and when are they possible? Both inequalities could be summarized in the general form

$$P\{F(p,p')>0\}\geqslant Q\quad .\quad .\quad .\quad .\quad .\quad (1)$$

where F is a given function of p and p', and Q is a magnitude independent thereof. In (A) p' is made explicit with respect to p, in (B) the obverse takes place. Therefore (B) seems to be a tautological transformation of (A); if (A) is true, so should be (B), which is so succinctly interpreted by Mr. Isserlis in the words quoted above. And yet we shall attempt to show that this interpretation cannot be maintained, that it is not generally true that when p' is known the probability of p falling between the limits given in (B), viz.

---

[*] Cf. also Oskar N. Anderson "Einfuhrung in die mathematische Statistik," Wien, 1935, pp. 112–115.

[†] Formulæ, denoted with capital letters, are so marked by Mr. Isserlis, while arabic numbers are given by the author of the present note.

[‡] This pessimism being expressed in the following words: "We do not and cannot know from the information supplied by the sample anything about the probability that p should lie between any named values."—*Philos. Trans.*, 1922, p. 327—as quoted by Mr. Isserlis.

$$\left(p' + \frac{t^2}{2n'} - \frac{t}{\sqrt{n'}}\sqrt{\frac{t^2}{4n'} + p'q'}\right)\Big/\left(1 + \frac{t^2}{n'}\right) \text{ and }$$

$$\left(p' + \frac{t^2}{2n'} + \frac{t}{\sqrt{n'}}\sqrt{\frac{t^2}{4n'} + p'q'}\right)\Big/\left(1 + \frac{t^2}{n'}\right) \quad . \quad . \quad . \quad (2)$$

is at least

$$1 - \frac{1}{t^2}\frac{n - n'}{n - 1} = Q_1 \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

Indeed, to say that the probability of a certain event is Q amounts to saying that in the long run the proportion of such events among all events belonging to the sphere of our observations (which sphere should be unequivocally determined) will tend to Q. In our case, *i.e.* in the case of (B), this would amount to asserting that among a long series of samples of n', showing a proportion of success p', the proportion of samples coming from populations having p within the limits (2) is at least Q_1. Is that unconditionally true? No, it is not, or rather we lack sufficient data to state the truth of the above proposition, depending, as it were, on the a priori distribution of p. In order to perform a *reductio ad absurdum* suppose the latter distribution is such that $P_{\text{a pr.}}\{p\} = 0$ for all values of p included within the limits given in (2) and $P_{\text{a pr.}}\{p\} > 0$ for some values of p without these limits. Then, of course, drawing in a sample a proportion of success equal to p' would be an improbable event (the degree of "improbability" being determined by the value of t chosen), but nevertheless the happening of such an event could not alter the *a posteriori* probability of p falling within the limits given in (2) from being zero.

Perhaps an example will clarify the trend of my reasoning. Suppose we are dealing with two populations, say, two bags of sweet-pea seeds, one of them giving 25 per cent. white flowers on the average, according to some confirmed genetic theory, the other—75 per cent. Now we gave some seeds to a second person, not disclosing to him what are the characteristics of the seeds in question nor of these contained in the other bag (it being assumed that we give out samples of seeds taken from one bag each time, but different samples can be taken from different bags). Suppose, further, these seeds have been sown and after maturity gave 20 plants, one-half of which had white flowers. If the person we are speaking about, read Mr. Isserlis' contribution, he will reason as follows: the probability is at least 0·75 that p is included between 0·295 and 0·705. We know this statement is erroneous, because we know that $P\{p\}$ is somewhere between 0 and 1 for $p = 0{\cdot}25$ and for $p = 0{\cdot}75$ and is nil for all other values of p. Of course, we are in a position superior to him in what concerns the knowledge of the conditions of the experiment, but we may expect him not to pronounce as true such statements the truth of which he is unable to demonstrate. A form that is free from such objections is of a disjunctive statement: either p is within the limits (2) or an improbable event happened, " improbable " to mean one whose probability is less than $1 - Q = 0{\cdot}25$ (in our case). This is actually the form of a significance test, a crude one, but very simple instead.

To sum up: in cases when our knowledge is restricted to the results of a sample, we cannot make statements about the probability of p belonging to a certain interval, lacking, as we are, sufficient data for such statements. The magnitude P of formula (B), interpreted by Mr. Isserlis as the probability of certain values of p, does not possess the fundamental property of probabilities, *i.e.* the property of being the " stochastical limit " of the ratio of cases conforming to a given hypothesis (p to be within given limits) to all cases. It is the more surprising that Mr. Isserlis gave the above interpretation of formula (B) as it evidently contradicts Bayes' theorem, which Mr. Isserlis admits to be true (p. 132).

§ 3. If the reader is willing to admit the soundness of the foregoing analysis, he certainly will ask, how can it be, that (A) is an uncontestable truth and (B) is alleged to be false—at least in a certain interpretation—while both (A) and (B) are only transformations of each other? In terms of symbols, the answer is easy. Such symbols as $P\{Z\}$ are incomplete: they should have the shape $P\{Z|H\}$ to be read "the probability of Z given H." We very often drop H or what would correspond to it because the underlying assumptions are known or sufficiently explained in the text. If we say that the probability of drawing an ace is 1/13, it is tacitly understood that we are dealing with a normal pack of cards. Occasionally, however, such shorthand may give rise to misunderstandings. If instead of (A) we write:

$$P\left\{p - t\sqrt{\frac{pq}{n'}} < p' < p + t\sqrt{\frac{pq}{n'}}\,\middle|\,\text{given } p\right\} \geqslant 1 - \frac{1}{t^2}\frac{n-n'}{n-1} \quad (4)$$

this is perfectly simple and no one can object against rewriting it in the form:

$$P\Big\{\Big(p' + \frac{t^2}{2n'} - \frac{t}{\sqrt{n'}}\sqrt{\frac{t^2}{4n'} + p'q'}\Big)\Big/\Big(1 + \frac{t^2}{n'}\Big) < p < \Big(p' + \frac{t^2}{2n'} + \frac{t}{\sqrt{n'}}\sqrt{\frac{t^2}{4n'} + p'q'}\Big)\Big/\Big(1 + \frac{t^2}{n'}\Big)\Big| \text{given } p\Big\} \geqslant 1 - \frac{1}{t^2}\frac{n - n'}{n - 1} \qquad (5)$$

which is more clumsy than (4) but expresses strictly the same thing as (4). But if instead of (5) we write:

$$P\Big\{\Big(p' + \frac{t^2}{2n'} - \frac{t}{\sqrt{n'}}\sqrt{\frac{t^2}{4n'} + p'q'}\Big)\Big/\Big(1 + \frac{t^2}{n'}\Big) < p < \Big(p' + \frac{t^2}{2n'} + \frac{t}{\sqrt{n'}}\sqrt{\frac{t^2}{4n'} + p'q'}\Big)\Big/\Big(1 + \frac{t^2}{n'}\Big)\Big| \text{given } p'\Big\} \geqslant Q' \quad . \quad . \quad . \qquad (6)$$

it becomes evident that in (5) and (6) we are dealing with probabilities based upon different assumptions and therefore Q' need not be equal to $1 - (n - n')\ t^2(n - 1)$. In both (5) and (6) we try to determine the probability of the same inequality but the data from which to determine this probability are in each case different. In § 2 I endeavoured to show that the conditions peculiar to (6) are insufficient for the determination of Q'.

It is sad to say, but it seems as if R. A. Fisher's pessimism, which Mr. Isserlis challenged, were to remain justified.

ON PARETO'S LAW

BY C. BRESCIANI-TURRONI

1. "Pareto's Law" has often been discussed by English statisticians and economists. Without doubt the most interesting and successful applications of this law to actual statistics have been made by Professor Bowley * and Sir Josiah Stamp.† According to Professor Bowley, "there is no doubt that [Pareto's Law] is of great service in estimating details when gross numbers are known, for interpolating and for interpretation." ‡ This is also the opinion of Sir Josiah Stamp, who writes that Pareto's law "is an empirical formula, which fits the distribution of incomes in different countries with success, and which may therefore be used with confidence as an interpolation formula." §

Several more recent publications also show that the interest in Pareto's law and its applications has not yet subsided in this country.||

In the present paper I shall deal more especially with a problem which has hitherto attracted but little attention from English writers—namely, the significance of the changes in the slope of the income curve. In his earlier writings on the distribution of income Professor Bowley adhered to Pareto's interpretation, but afterwards he declared that Pareto was wrong when he stated that as α increases so does the inequality of incomes.¶ Professor Pigou states that the appropriateness of Pareto's interpretation is a "matter of debate."** In view of the investigations of Italian economists, Dr. Hugh Dalton is inclined to interpret Pareto's measure in the sense that, as α increases, inequality diminishes, but he believes that the question requires further study.††

2. It was without doubt the merit of Pareto to have stressed the

---

* *Select Committee on the Income Tax*, 1906. The general agreement between Professor Bowley's estimates and the actual super-tax statistics published afterwards is very striking. (J. Stamp, *British Incomes and Property*, London, 1922, p. 329.)

† "A New Illustration of Pareto's Law," in *J.R.S.S.*, 1914. See also the recent paper of the same author "The Influence of the Price Level on the Higher Incomes, *ibid.*, 1936.

‡ "The British Super-tax and the Distribution of Incomes," *Quarterly Journal of Economics*, 1914, p. 258.

§ *British Incomes and Property*, p. 464.

|| See L. R. Connor " On Certain Aspects of the Distribution of Income in the United Kingdom, 1913 and 1924, *J.R.S.S.*, 1924; D. H. MacGregor, "Pareto's Law," B. P. Adarkar and S. N. Gupta, "The Pareto's Law and Incomes in India," *Econ. Journ.*, March 1936. See also H. W. Singer, "The Courbe des Populations, a Parallel to Pareto's Law," *ibid.*, June 1936.

¶ *The Measurement of Social Phenomena*, first edition (1915), p. 209, second edition (1923), p. 210.

** *Economics of Welfare*, p. 647.

†† *The Inequality of Incomes*, p. 13 of Appendix.

necessity of making at the outset a clear-cut definition of "inequality of incomes." For Pareto, inequality diminishes when the number of the "rich" increases compared with that of the "poor." So far, Pareto adheres to a conception of inequality which was also that of older writers (for instance, Lassalle). Pareto gives the following numerical example: "Soit une collectivité A formée d'un individu ayant 10,000 francs de rente et neuf individus ayant chacun 1000 francs de rente; soit une autre collectivité B formée de neuf individus ayant chacun 10,000 francs de rente et d'un individu ayant seulement 1000 francs de revenu. . . . Nous dirons que en passant de A à B il y a eu diminution de la proportion de l'inégalité des revenus." *

But Pareto's peculiar contribution consists in having embodied the definition of inequality in a mathematical formula. If N_x is the number of individuals with incomes of x or more and N_h the number of individuals with incomes of h or more ($h < x$) and if we write:—

$$U_x = \frac{N_x}{N_h} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad [1]$$

according to Pareto's definition the inequality of incomes diminishes when U_x increases.† If we substitute for N_x and N_h the values which result from the well-known Paretian equation of the income curve ‡ we have:—

$$U_x = \left(\frac{h}{x}\right)^{\alpha} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad [2]$$

It follows that U_x *varies inversely with* α, if the ratio h/x is supposed to remain constant. Therefore as α increases, so does the inequality of incomes.

3. But we may approach the problem from another definition of inequality. If N_h represents the number of individuals with incomes equal to or greater than h, and N_x is the number of those who possess incomes equal to, or greater than $x (x > h)$, then, the ratio N_x/N_h being kept constant, the distribution of incomes is the more uneven, the greater the ratio of the average income of the sub-group N_x to the average income of the whole group N_h. This definition is, I think, consistent with the common notion of the meaning of

---

* *Manuel d'Economie Politique*, p. 389.

† *Cours d'Economie Politique*, Vol. II, p. 320 footnote.

‡ The equation is $N_h = \frac{A}{h^{\alpha}}$, where α and A are constants. In the present paper this equation will be called Pareto's first law. Pareto, however, proposed another more general equation $N_h = \frac{A}{(h + a)^{\alpha}}$ with three constants: A, α and a, which will be called Pareto's second law In the case of this second equation we have $U_x = \left(\frac{h + a}{x + a}\right)^{\alpha}$.

inequality of incomes. Now, let M_r/M_h indicate the ratio of the average incomes. In the case of Pareto's first law we have :—*

$$\frac{M_r}{M_h} = \frac{x}{h} = \sqrt[\alpha]{\frac{N_h}{N_x}} \quad . \quad . \quad . \quad . \quad . \quad . \quad [3]$$

Thus, as α diminishes, the inequality of incomes increases—a conclusion which is the opposite of Pareto's.

The definition from which I have started can be put in a slightly modified form. If $N_x/N_h = p$ is the relative number of persons with incomes equal to or greater than x (x might be for instance the upper centile, or decile or quartile) and v is the median ($v < x$), then the distribution of incomes becomes more unequal when the ratio x/v increases. It is to this conception of inequality that Watkins and Sir Josiah Stamp, among others, adhere.† Under the assumption of Pareto's first law we have then :—

$$\frac{x}{v} = \sqrt[\alpha]{\frac{0{\cdot}50}{p}} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad [4]$$

Again, as α diminishes, the inequality of incomes increases.

The National Bureau of Economic Research in Washington has estimated the percentage of total income received by the highest 5 per cent. of the individuals having incomes. Clearly, the increase of this percentage is a sign of increasing inequality of incomes. If I is the total income, and P the amount received by the highest

---

* If $N = f(x)$ is the cumulative income curve, then the number of individuals with incomes between x and dx is $f'(x)dx$ and their aggregate income is $xf'(x)dx$. The aggregate income of the individuals with incomes between h and k is therefore $\int_h^k xf'(x)dx$. Solving this integral, we have in the case of Pareto's first curve, on the assumption that $a > 1$ and $k = \infty$: total income $= \frac{ah}{a-1}N_h$, and average income $= \frac{ah}{a-1}$. That we must assume $a > 1$ has been explicitly observed by Pareto in his discussion with Professor Edgeworth. (See "La curva delle entrate e le osservazioni del Prof. Edgeworth," *Giornale degli Economisti*, Nov. 1896, p. 446.)

† Watkins compares the upper decile with the median. For wages the upper decile is always somewhat less than twice the median; for salaries it is approximately twice the median, and for properties from eight to thirteen times the median (*The Growth of Large Fortunes*, p. 18). If, in equation [4] $p = \frac{1}{10}$, and x is therefore the upper decile, we have $\frac{x}{v} = \sqrt[a]{5}$, so that Watkins' index (the ratio of the upper decile to the median) increases when a diminishes. In Sir Josiah Stamp's opinion, a fair test of the distribution at one time compared with another can be got "if we say roughly that the person occupying a place along the scale one-quarter up the series has an income such and such a fraction of the income of the middle person of the series, and that the person three-fourths of the way up has an income so many times the middle one" (*Wealth and Taxable Capacity*, London, 1922, p. 79).

5 per cent. of income receivers, we have, according to Pareto's first law:

$$\frac{P}{I} = \sqrt[\alpha]{20} \times 0\cdot05 \quad . \quad . \quad . \quad . \quad . \quad . \quad [5]$$

Therefore, the percentage P/I increases when α diminishes. This is confirmed by the following figures* :—

	Value of α in the United States.	Per cent. of Total Income Received by Highest 5 per cent. of Income Receivers.
1916	1·42	34
1917	1·54	29
1918	1·69	26
1919	1·73	24

Professor Bowley's quartile measure of dispersion affords another test. In the case of Pareto's first law we have, indicating the minimum income by h and the upper and the lower quartile by Q_2 and Q_1, respectively, $Q_2 = \frac{h}{\sqrt[\alpha]{0\cdot25}}$, $Q_1 = \frac{h}{\sqrt[\alpha]{0\cdot75}}$, and

$$\frac{Q_2 - Q_1}{Q_2 + Q_1} = \frac{\sqrt[\alpha]{3} - 1}{\sqrt[\alpha]{3} + 1} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad [6]$$

Bowley's index is therefore a function of α and varies inversely with α.

4. As is seen from the numerical example reproduced above, Pareto states the problem of measuring statistically the inequality of incomes in the following form: *a fixed scale of incomes* being given, what is the number of persons possessing some given incomes in different periods or places? † It will be then readily admitted that the increase in the relative number of the higher incomes is a sign of less inequality.

I must emphasize that Pareto, when explaining the significance of changes in α, made no "curious slip," as was contended by Professor Allyn Young; ‡ nor is it true that he "curiously misinterpreted the changes in the slope of the income curve," as the statisticians of the National Bureau of Economic Research " affirm.* Pareto's interpretation of the changes in the value of α is the logical consequence of his definition of inequality, as expressed by formula [1]. This standpoint was always taken by Pareto himself, also in private conversation with the present writer. He never took into consideration his critics' objections against his interpretation, because, as he said, they proceeded from a definition of inequality which differed from his own; and, in his opinion, it was futile to argue about definitions, since definitions are *arbitrary*.

---

* The figures of the first column are found in Vol. II of *Income in the United States* (Publications of the National Bureau of Economic Research, Washington), those of the second column are given in Vol. I, p. 115.

† It should be observed that when the highest income k is a finite quantity, Pareto's line is distorted, which renders it necessary to modify Pareto's formulæ. This point has been exhaustively discussed by Bortkiewicz in his paper "Die Disparitatsmasse der Einkommenstatistik," XIXth Session of the International Statistical Institute, Tokio 1930, p. 53.

‡ "Do the Statistics of the Concentration of Wealth in the United States Mean what they are Commonly Assumed to Mean?" *Quarterly Publications of the American Statistical Association*, Vol. XV, 1912, p. 474. Professor Young did not notice the printing mistake in the *Cours*, Vol. II, p. 320, which was afterwards corrected in the *Manuel*, p. 390.

On this it might be observed that a definition of inequality must prove appropriate as a tool for analysing real facts. In some actual cases, the income range remains constant, and then Pareto's definition is an appropriate one. An example is given by the distribution of income among individuals as compared with the distribution among families. It has been often observed that, in general, statistics give a distorted picture of the real structure of income distribution, because a great many young people belonging to workers' families are assessed independently, which enormously increases the number of the " poor." It was for this reason that in Saxony, at the suggestion of Professor Würzburger, income statistics were rearranged in such a way as to show the distribution of income among families. The results are interesting. While the total number of families, in 1913, was 1,204,000, that of individual incomes—excluding unattached persons—amounted to 1,812,000. This difference is almost wholly accounted for by the difference between the number of individual incomes and the number of families in the lower income groups. Whilst 44·4 per cent. of the individuals had less than 950 marks, the percentage of family incomes below this limit was only 18·0. On the other hand, between 1600 and 10,000 marks there were found only 12·5 per cent. of individual incomes as against 31·4 per cent. of family incomes.† It seems correct to conclude that the distribu-

---

* *Income in the United States*, Vol. 1, p. 123.

† *Das deutsche Volkseinkommen vor und nach dem Kriege*, Berlin 1932, Statistisches Reichsamt, p. 106. The distribution of income among individuals (A) and families (B) was as follows :—

Marks.	Number of Incomes (in thousands).	
	A	B
Less than 950	804	217
950–1600	569	379
1600–3100	303	406
3100–5800	84	142
5800–10,000	28	35
More than 10,000	24	25

tion among families was more satisfactory than the distribution among individuals.

5. But this is a quite peculiar case. In general, the income range is not the same in the income distributions with which we are dealing. Economic history shows that a general shift in the whole income scale has taken place in the last few centuries, and that at the same time the range of money incomes has increased enormously as a consequence of the rise of the highest incomes. As D'Avenel writes, "Les richissimes d'aujourd'hui sont six fois plus riches que les plus riches personnages de l'ancien régime; ils sont dix fois plus riches que les plus opulents princes des temps féodaux." *

To turn to a more recent epoch, Prussian income statistics show, for instance, that from 1855 to 1875 the number of recipients of large incomes (above Thaler 52,000) continually increased in Berlin (from 8 to 58). At the same time, however, the high incomes became still higher, as the following figures show.†

Thaler.	Distribution of Incomes in Berlin.				
	1855.	1860.	1865.	1870.	1875.
52,000– 60,000	2	6	5	8	17
60,000– 80,000	6	2	3	5	9
80,000–100,000			2	4	10
100,000–120,000		2	1	3	3
120,000–140,000		1	—	1	7
140,000–160,000			2	1	3
160,000–180,000			1	—	1
180,000–200,000				3	2
200,000–240,000				—	2
240,000–300,000				1	1
Above 300,000					3
	8	11	14	26	58

More recent Prussian figures also confirm that the highest incomes have continually risen in the last few decades and at a more rapid rate than the average income.

Average Income in the Highest Income Class.

(millions of marks).

1892	6·8	1913	23·8
1900	15·1	1917	30·5

According to some calculations made by Propokovich, the average income of the highest 0·5 per cent. of the population was in Prussia

---

* D'Avenel, "Les riches depuis sept cent ans," *Revue des deux Mondes*, 1906, vol. 31, p. 831. See also Schmoller, "Die Einkommensverteilung in alter und neuer Zeit," in his *Jahrbuch*, 1895, p. 1069.

† The figures are taken from Engel's paper "Die Klassensteuer und klassifizierte Einkommensteuer im preussischen Staate 1852–1875," *Zeitschrift des konigl. stat. Bureaus*, Berlin 1875.

26·8 times the average income of the whole population in 1875; 35·0 times in 1896; 47·4 times in 1919.*

I will give another example. "Allenstein" is a comparatively poor agricultural district in Eastern Prussia. On the contrary, the Potsdam district is very wealthy. There were in 1913 only 19 incomes above 100,000 marks in the former district and 870 in the latter.† This difference was only in small part accounted for by the difference in population between the two districts. The large number of incomes above 100,000 marks in Potsdam is by no means a sign of greater equality. Indeed, the high incomes were distributed as follows in the two districts:—

Marks.	Allenstein.	Potsdam.
100,000–200,000	15	635
200,000–300,000	3	132
300,000–400,000	1	53
400,000–500,000		10
500,000–600,000		11
600,000–700,000		5
700,000–800,000		8
800,000–900,000		4
900,000–1 million		4
Above 1 million		8

Pareto's definition of inequality of incomes (see formula [1]) does not take into consideration how the incomes above the upper income x are distributed in different periods or places. This makes the definition quite inadequate as a tool of statistical analysis.

It is astonishing that Pareto was not struck by the absurdity of some of the results to which he was led by his conception of inequality. He contended, against the most obvious evidence, that incomes from property are distributed less unevenly than incomes from labour.‡ He did not hesitate to conclude that in large cities such as Hamburg and Bremen, where the income curve ascends to tremendous heights and a small percentage of very rich people receive a very large percentage of total income,§ the distribution of income among individuals is less unequal than in the Swiss canton Uri, where nobody gets more than a moderate income.

---

* "The Distribution of National Income," *Economic Journal*, March 1926, p. 72.

† *Mitteilungen aus der Verwaltung der direkten Steuern im preussischen Staate: Einkommensteuerstatistik*, Berlin, 1913.

‡ See "Aggiunta allo studio della curva delle entrate," *Giornale degli Economisti*, 1897, p. 21.

§ For Hamburg, Bremen and Uri a is equal respectively to 1·13, 1·18 and 2·098 according to Pareto (*Aggiunta*, etc., pp. 22 and 25). That means, according to formula [5], that the highest five per cent. of population received in Hamburg 71 per cent. of the total income and in Uri only 22 per cent.

6. Professor Cannan affirms in a well-known article * that the economic theory of distribution should give an answer to the question "why inside each community some individuals and families are *above* and others *below* the average in wealth."

This suggests that we may take as a measure of inequality the *ratio of the number of individuals with incomes above the average income to the total number of income-receivers.* This method has the advantage of giving a definite sense to the otherwise meaningless expressions, "the poor" and "the rich." The line of division between these two groups is then the average income.

Slightly modifying Pareto's definition, I shall assume that inequality diminishes when the number of people with incomes above the average income increases compared with the total number of people. It is not without interest to notice that this definition leads to an interpretation of the changes in the slope of distribution which is the reverse of that accepted by Pareto.

Let N_h and N_m be, respectively, the total number of income receivers and the number of those with incomes above the average income. Then we have, in the case of Pareto's first law (and on the assumption that $\alpha > 1$ and the highest income $= \infty$) :—

$$\frac{N_m}{N_h} = \left(\frac{\alpha - 1}{\alpha}\right)^\alpha \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad [8]$$

It can be readily seen by differentiating this function that the ratio N_m/N_h *varies directly with* α; in other words, as α increases, so, according to the above definition, does the equality of incomes.

For instance, for α equal to 1·2 and to 1·9 respectively—these are the limits within which α has been found, practically, to vary—N_m/N_h is equal, respectively, to 11·6 per cent. and to 24·2 per cent. For $\alpha = 1{\cdot}5$ we have $N_m/N_h = 19{\cdot}2$ per cent.; in fact, very often actual statistics show that the number of people with incomes above the average income is about 20 per cent. of the total number.

Formula [8] shows that the percentage of people with incomes above the average income depends only on α. Therefore, when an income distribution follows Pareto's law, *that percentage will be the same whether it is calculated for the whole series, or whether the lower income classes are left out.*

7. But is the ratio N_m/N_h an appropriate measure of the inequality of income distribution? Or is it necessary to take into account also the *percentage of total income* possessed by the individuals with incomes above the average income?

---

* "The Division of Income," *Quarterly Journal of Economics*, 1905, p. 341.

Indicating the aggregate income by I_h and the income of the group N_m by I_m we have, according to Pareto's first law,*

$$\frac{I_m}{I_h} = \left(\frac{\alpha - 1}{\alpha}\right)^{\alpha-1} \quad . \quad . \quad . \quad . \quad . \quad . \quad [9]$$

The percentage of total income also depends only on α.* It follows that, when in two distributions the value of α is the same, the percentage of total income held by people with incomes above the average income is also the same. The difference between the percentage of total income (I_m/I_h) and the percentage of total number (N_m/N_h) is

$$D = \left(\frac{\alpha - 1}{\alpha}\right)^{\alpha} \frac{1}{\alpha - 1} \cdot \quad . \quad . \quad . \quad . \quad . \quad [10]$$

D is equal to half the average deviation from the average income, expressed as a percentage of the latter.† This index of inequality is evidently 0 in the case of perfect equality and tends to 1 with the increase of inequality.‡

If we differentiate function [10] it results that α and D are of opposite sign.§

We might conclude : when the ratio N_m/N_h diminishes (increases) —which happens when α diminishes (increases)—the difference between I_m/I_h and N_m/N_h (that is to say, the index of inequality D) will increase (diminish) ; therefore, the percentage of income receivers with incomes greater than the general average is a good measure of the inequality of incomes when the actual distribution follows Pareto's first law.

---

* The percentage of income is therefore equal to the percentage of total number $\left(\frac{a-1}{a}\right)^a$ multiplied by $\frac{a}{a-1}$. When, as happens frequently, a is equal to about 1·5, and the relative number of taxpayers with incomes above the average income is known, the percentage of total income belonging to them will be easily calculated by multiplying by three the percentage of total number.

† Formula [10], which shows the relation between Pareto's constant a and the relative mean deviation, has been given by the present writer, in a slightly different form, in his paper "Di un indice misuratore della disuguaglianza dei redditi," *Studi in onore di B. Brugi*, Palermo, 1910. See also Bortkiewicz, *op. cit.*, p. 36.

According to formula (10), D is equal to the relative number of taxpayers with incomes above the average income multiplied by $\frac{1}{a-1}$. In the case when $a = 1{\cdot}50$, in order to obtain D it will be, therefore, sufficient to multiply by two the percentage $\frac{N_m}{N_h}$.

‡ Mortara, "Metodi elementari per lo studio delle distribuzioni di caratteri," *Giornale degli Economisti*, 1910. See also Ricci, " L'indice di variabilità e la curva dei redditi," *ibid.*, 1916.

§ The relation between D and a, as expressed by formula (10), is valid only in the case when $a > 1$ and the maximum income $= \infty$. For the case when $a < 1$ Bortkiewicz has given other formulæ which show that when $a < \frac{1}{2}$, D and a vary not in the opposite but in the same sense (*op. cit.*, p. 62). From Bortkiewicz' formulæ it also follows that when $a < 1$, and the maximum income is a finite quantity, D might become an unreliable index of inequality; for instance, in the table given by Bortkiewicz on p. 62, D is the same for both $a = 0{\cdot}1$ and $a = 0{\cdot}9$.

Formula (10) shows that the index of inequality D—since it depends only on α—remains constant in a given distribution which follows Pareto's first law, whether we calculate it for the whole series or omit the lower income groups. This property of D is worth noticing. The " standard deviation " does not behave in the same way, since it decreases as the range of incomes is made less; so that, as Persons observes, it is not legitimate to compare the concentration of different ranges of incomes by means of the standard deviation.*

The following table gives some values of D, calculated from Prussian statistics.†

Incomes above Marks.	Value of D in Prussia, 1892.
900	0·37
3000	0·38
6000	0·37
9500	0·38

8. Even those statisticians and economists who were inclined to attribute a considerable importance to Pareto's inquiries, always confined their attention to his first law and never took his second law into consideration. It is possible that in some cases the agreement between actual and theoretic distributions would have been closer if Pareto's second equation of the income curve had been tried instead of the first equation. The statisticians of the National Bureau of Economic Research concluded, from a detailed examination of American statistics, that " Pareto's law " is quite inadequate as a mathematical generalization ‡ " since the trends of the distributions on a double log scale are not, in a significant degree, linear." But it should not be forgotten that Pareto himself—as may be seen from pages 310 and 312 of the *Cours*, Vol. II—explicitly states that it is the equation $\log N = \log A - \alpha \log (x + a)$ which represents the general law of distribution of individual incomes.§ Even when

---

* " The Variability in the Distribution of Wealth and Income," *Quarterly Journal of Economics*, Vol. 23, 1909, p. 440.

† Several other examples will be found in *Ricchezza delle città* (Palermo, 1912, p. 54), by the present writer. Professor Gini (*Sulla misura della concentrazione e della variabilità dei caratteri*, Atti del R. Istituto Veneto, Padova, 1913–1914) has shown that even the " concentration index " is not influenced by the range of incomes, when the distribution follows Pareto's first law, since the concentration index also depends only on a.

‡ *Income in the United States*, Vol. II, p. 393.

§ Pareto gave (*Cours*, Vol. II, p. 305) a still more developed form of his law, with a fourth constant β, which, however, he believes can in general be neglected.

Pareto gives the mathematical definition of inequality, and when he states the relations between the average and the minimum income, it is the latter law which he assumes.

Pareto's second law presents some peculiarities which I shall presently point out.

The percentage of people with incomes above the average income is

$$\frac{N_m}{N_h} = \left(\frac{\alpha - 1}{\alpha}\right)^{\alpha} \quad . \quad . \quad . \quad . \quad . \quad [8 \text{ bis}]$$

as in the case of Pareto's first curve. But the percentage of total income possessed by people with incomes above the average income is

$$\frac{I_m}{I_h} = \frac{(\alpha - 1)^{\alpha - 1}}{\alpha^{\alpha}} \; \frac{\alpha^2 h + a(2\alpha - 1)}{\alpha h + a} \quad . \quad . \quad . \quad [11]$$

Therefore, while the relative number of persons with an income above the average is not influenced, in a given series, by the range of incomes—since it only depends on the constant α—*the percentage of total income depends on h*; more exactly, when a is positive (as actually happens in most cases) the ratio I_m/I_h decreases, if h increases.

It follows that—unlike what happens in the case of Pareto's first law—the difference between the percentage I_m/I_h and the percentage N_m/N_h (that is to say, the index of inequality D) does not remain constant, in a given series, when the lower class intervals are left out. I shall give an example from actual statistics :—

Distribution of Properties in Prussian Cities (1905).*

Class Intervals.	Index of Inequality D.
Above marks 6,000	0·53
„ 20,000	0·49
„ 52,000	0·44
„ 100,000	0·40
„ 200,000	0·36

The influence of the range of properties on the value of D is very considerable. We might conclude that—since statistics of incomes or of properties very often do not cover the whole population, but only the number of incomes or of properties above a certain exemption limit, which varies in different places or times—the index D drawn from actual statistics cannot be considered in general as a sufficiently approximate measure of inequality for the whole (unknown) curve, unless the latter can be reasonably assumed to follow Pareto's first law. It also follows from formula [11] that, if α and h do not vary, the percentage of total income possessed by the people with incomes greater than the average varies directly with a; which means that as a increases so does the inequality. On the contrary, Pareto's definition of inequality leads to the conclusion that the inequality diminishes when a increases.*

---

* The figures from which the indexes of inequality have been calculated will be found in Kühnert's article, " Die Ergebnisse der Einkommensteuerveranlagung nach Städtegruppen im Jahre 1905, *Zeitschrift des preussischen stat. Landesamts*, 1907.

Formula [11] shows that if in two distributions following Pareto's second law the relative number of people with incomes above the average income is the same, the percentage of total income belonging to those people will not be the same, unless the ratio a/h does not vary. Therefore—unlike what has been found above, respecting Pareto's first law—*the relative number of people with incomes above the average income, taken alone, is an inadequate criterion of the inequality of distribution.* The percentage of total income must also be taken into account.

We might conclude that Pareto's definition, even in the modified form which has been suggested above, is inadequate in respect to his second law.

---

* *Cours*, vol. II, p. 321.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

CONTENTS.

PAGE
1.—Report of the Import Duties Advisory Committee on the Iron and Steel Industry ... 433
2.—*International Labour Office*—Maritime Statistical Handbook 436
3.— *Harrod* (*R. F.*). The Trade Cycle 438
Hawtrey (*R. G.*). Capital and Employment ... 438
4.—*Einzig* (*Paul*). Theory of Forward Exchange 440
5.—*Lucas* (*A. F.*). Industrial Reconstruction and the Control of Competition 443
6.—*Sayers* (*R. S.*). Bank of England Operations, 1890–1914 445
7.—*Shaffner* (*F. I.*). The Problem of Investment ... 445
8.—*Jones* (*D. Caradog*). Trade Revival in a Depressed Area 447
9.— *Wheldon* (*H. J.*). Business Statistics and Statistical Method ... 448
Holmes (*R. L. A.*). Statistics for Professional Students 448
Burton (*Clement*). A Concise Manual of Statistics 448
10.—*Rountree* (*G. M.*). The Railway Worker 450
11.—*Porteous* (*D. A.*). Pension and Widows' and Orphans' Funds 451
12.—*Wilzin* (*Leo*). Musikstatistik 453
13.—*Elsas* (*M. J.*). Umriss einer Geschichte der Preise und Löhne in Deutschland ... 455
14.—*Rist* (*Charles*), *and others*. L'Enseignement économique en France et à l'étranger ... 455
15.—Other New Publications ... 457

1.—*Report of the Import Duties Advisory Committee on the Present Position and Future Development of the Iron and Steel Industry.* Stationery Office, 1937. 9¾" × 6". 117 pp. 2*s*.

At the May meeting of the Society our President drew attention to the vast quantity of economic material compiled by Royal Commissions, Departmental Committees, and Public Departments which is buried in blue books and white papers and forgotten, and he suggested the formation of what we may perhaps call a Rescue Society for the purpose of redeeming and popularizing the more important parts of those documents. It is to be hoped that no such operation will be necessary in the case of the masterly report now before us, though we recall with regret that a previous report (Cmd. 5201) dealing with the current practices of the iron and steel industry attracted little attention among the general public. That may have been because it was issued under the unattractive title of "Memorandum on Clause 6 of the Finance Bill, 1936," and one feels almost disposed to advise the Stationery Office to secure the services of some firm of publicity agents to instruct the public as to the real contents and importance of their publications. One would certainly advise professors of economics to adopt this new report as a text-book and devote a course to its exposition and criticism; their pupils would find that far more inspiring than economic transcendentalism or than grubbing among outworn theories. Here we can see economics in the making, and those who are interested in the probable shape of things to come—and that should be everyone—

will find a sketch of the future organization of, at least, the "heavy" industries of the country.

The Report opens with an admirable summary of the history of the iron and steel industry after the War, which is supplemented by tables showing the output of and trade in the chief iron and steel products. That history ended with an appeal to the Government to save the industry from ruin and with the assignment to the Import Duties Advisory Committee of the duty of considering the reorganization of the industry. Since 1933 we have seen the formation of the British Iron and Steel Federation (whose constitution is given in an appendix), a voluntary body, but under official auspices, to which all the important sectional associations except two belong; the setting-up of a series of import duties which effectively protect British iron and steel firms from the ruinous competition which was strangling them; and the entry of the British Federation into the Continental Steel Cartell. The last was a really revolutionary development, for it was achieved under the direct encouragement of the British Government, which temporarily imposed penal import duties in order to compel the Continental Cartell to agree to reasonable terms of trade-sharing. The Federation has thus obtained "a quasi-monopolistic position in the home market," and the Committee are satisfied that "there cannot be a return to the lack of organization, the almost casual development, and the competition largely unrestricted at home and almost wholly unrestricted from abroad, which characterized the industry before 1932." They are also convinced that "the State cannot divest itself of responsibility as to the conduct of a protected industry so far-reaching in its scope, so vital to the national well-being, so largely affected by state fiscal policy and now being brought into a closely-knit organization."

The two main problems that arise in considering the planning of an industry so that at the same time prosperity may be assured and the public interest conserved are prices and the entrance of new competitors. As a pre-requisite there must be determined "an optimum capacity of production, both in gross and by categories of commodities," an optimum which must always be fluid and must aim at a well-balanced production with a reasonable additional capacity for meeting unforeseen demands, while leaving a margin to be filled by imports. The Federation early accepted the view that prices should be moderate, stable, and based on costs of production, and that a uniform national price, including delivery charges, should be aimed at. In 1935 the Federation and the associations collected from typical concerns particulars of the cost of production of the cruder forms of iron and steel and submitted them to the Import Duties Advisory Committee, which body, after "thorough examination and discussion," sanctioned increases in the prices of pig-iron, and steel billets. The same procedure has been followed for other products, and the prices of thirteen classes of iron and steel have now been brought under review by the Committee, and the makers of foundry iron (who are not in the Federation) have also followed the same course. The Committee are satisfied that "the method of control adopted by the Federation appears to be well-devised and in the interests of producers and consumers alike," but they suggest that rebates and quotas should be subject to a general oversight "by an independent body looking to the general public interest."

Development may be carried out either by present members of the industry or by new competitors. In December 1936 the Federation formed a committee to consider all proposals for expansion and to report thereon to the Federation and to the Import Duties Advisory Committee. In four cases—the United Steel Companies at Scunthorpe, Messrs. Colville at Clydebridge, the new sheet plant of John Summers and Sons, and the new Jarrow scheme—both the Federation Committee and the Import Duties Advisory Committee, after due examination, approved the proposals, and the latter body regret that a similar apparatus of enquiry and decision was not available when the original Jarrow scheme was under discussion. This procedure is approved in the Report as "a means of preventing excessive or ill-balanced expansion while not discouraging initiative, energy, and willingness to take risks," and it is to be noted that the Federation admitted that their own committee "should be charged with the responsibility of keeping the capacity of the industry under review and taking the initiative when necessary." The point of cardinal importance in the scheme is the appointment of an independent body "charged with the duty of considering the proposals in the national interest"; while leaving aside technical and financial aspects, "in the review of any scheme, and especially of one involving the transference or closing of works to any substantial extent, or displacement of labour by the introduction of new methods, it should have regard not only to the relation of the scheme to the general plan of the industry, but also to possible social consequences, including the probable effects upon labour and the local government authorities." It would be highly unlikely that a scheme condemned both by the Federation and by the independent body would receive the necessary public support and financial facilities, but if the independent body rejected on public grounds a scheme endorsed by the Federation, persistence in attempting to carry it out "would justify active intervention by the Government." It is also of importance that any new concern "desirous of joining and willing to subscribe to the rules" has the right to join the Federation and the appropriate association and, therefore, to secure the allotment of a production quota where a quota scheme is in operation, but to avoid abuses the Report suggests that "any new scheme projected by interests outside the industry should conform to the procedure" outlined above.

The Report contains much that is interesting on such subjects as transport, merchanting, labour and other social questions, the defacement of the countryside by surface mining, etc., but it has been necessary to concentrate on its two main features. Much more might have been written about these, but perhaps enough has been done to show that in this Report we have a State document which no one can afford to ignore.
H. W. M.

2.—*Maritime Statistical Handbook. International Labour Office (League of Nations), Geneva.* London: P. S. King, 1936. 9½″ × 6¼″. vii + 223 pp. 5*s*.

The present volume is the completed edition of a draft and proof distributed at a preparatory meeting in 1935 and at the Twenty-first (Maritime) Session of the International Labour Conference held in Geneva in October 1936. It is intended to be a summary of some of the data relevant to international treatment of the problems of hours of work on board ship, manning, and holidays with pay for seamen for about thirty countries.

Part I deals with the salaries and wages of merchant marine officers and other ratings; Part II with the number of merchant marine officers and other ratings; and Part III with the classification of sea-going merchant tonnage.

The information was supplied by Government Departments, supplemented by Shipowners' and Seamen's Organizations.

The salaries and wages are, in the main, those in operation in the summer of 1936. The figures of merchant marine personnel are for some date in 1935, and the classification of merchant tonnage refers to January 1, 1935. The compilation will prove very useful, but the reader will need to exercise great care in making international comparisons. The larger ships engaged in the ocean-carrying trade are in direct competition. A part of their expenditure is incurred in home and a part in foreign ports.

Seamen engaged on such ships spend as a rule a part only of their wages at ports of call; the remainder, usually the greater part, is paid to them in the home port at the end of the voyage, or paid on their behalf to their families at home, so that national values of money and national costs of living have to be borne in mind, and perhaps also national standards of living, when making comparisons. The monthly wage of an A.B. "sailor," "seaman" or "deck-hand" of £8 15*s*. 6*d*. with free food on steamers belonging to the United Kingdom at July 1, 1936,* cannot be compared with the rate of 40 yen per month—say, £2 7*s*. 6*d*.—for Japanese vessels of 3,500 gross tons and over, without taking the above considerations into account.

As regards numbers of seamen, the headings and footnotes to the tables have to be noted. 152,793 seamen, including 6,345 foreigners and 43,125 lascars, are quoted from the Census of Seamen, June 15, 1935, as being employed on sea-trading vessels registered in the United Kingdom, and 183,211 as the total number forming the first crew of vessels employed some time during the year, *i.e.* including those not employed on the census date. Neither figure, of course, can be expected to agree with the census occupation tables, in which 116,610 males were enumerated in 1931 under the headings Navigating Officers and Pilots, Engineering Officers, Petty Officers, Seamen and Deck-hands, Wireless Operators (sea-going), Firemen, Trimmers, Greasers and Donkeymen, Pursers, Stewards and Domestic Staff, and under the last heading 1,128 females.

The tonnage classification in Part III is intended to show the number and gross tonnage of mechanically propelled sea-going cargo- and/or passenger-vessels of over 400 gross tons on the national register. This total is divided into coal-fired and oil-fired steamships and motor-ships. It is again subdivided, according to nature of service, into tramps, cargo-liners, passenger and combined cargo- and passenger-liners and tankers, indicating separately where possible for each category the ships engaged only in the coasting trade. The four categories are also tabulated in tonnage groups. In this part the interpretation of the figures and international comparisons are particularly difficult. The same vessel may be employed as a tramp on one voyage and as a liner on another. It may be employed both in the coasting trade and in the foreign trade. To take one illustration, the Handbook, using information supplied by the Mercantile Marine Department of the Board of Trade, states that on December 31, 1935, there were 1,534 tramp vessels of 4,857,327 gross tons, and that of these, 180 of 211,131 gross tons were engaged in the coasting trade, the remainder being engaged in the foreign trade and in the home trade, *i.e.* in trade between the United Kingdom and continental ports between the Elbe and Brest. These figures neither answer the question "How much shipping owned in Great Britain is habitually engaged in tramp trades?", nor the question "How much is sometimes so engaged?" An Enquiry carried out by the Chamber of Shipping last year showed that the number of United Kingdom ships usually engaged in the foreign-going tramp trade was about 1,000, of a little over 4 million gross tons, including an estimate of the full-time tramp employment of vessels belonging to cargo-liner fleets occasionally so employed. On the other hand, it is known that nearly 8 million gross tons of shipping registered under the British Shipping (Assistance) Acts with a view to applying for subsidy in respect of eligible voyages. It would appear that in 1936 about five-sixths of the shipping subsidy was distributed to about 3½ million gross tons engaged on tramp voyages all the time they were employed during the year, and about one-sixth to 3 or 4 million gross tons of cargo-liner tonnage occasionally employed on eligible tramp voyages. This tends to diminish the reliability of the summary table on pages 204–205, which states that out of 54 million gross tons of ships of over 400 gross tons owned by the principal maritime countries in January 1935, nearly 14½ million gross tons (including nearly 5 million tons in Great Britain) were tramps, and the remainder cargo- and passenger-liners and tankers. No better table is available, but it is probable that the world total of vessels usually engaged as sea-going tramps is less than 10 million gross tons, and in particular the United Kingdom total is less than 4 million gross tons. On the other hand, the world total of steam- and motor-ships occasionally engaged on tramp voyages may be more than 14½ million gross tons.

---

* These rates were increased in January 1937.

Great credit is due to the compilers for collecting this difficult material and presenting it succinctly and with the proper annotations. L. I.

3.—*The Trade Cycle*, an Essay by R. F. Harrod, Student of Christ Church, Oxford. Clarendon Press, 1936. 8¾" × 5¾". x + 234 pp. 10s.

Capital and Employment. By R. G. Hawtrey. London: Longmans, 1937. 8¾" × 5¾". xi + 348 pp. 15s.

Professor Hutt of the University of Capetown has proposed in his recent book, *Economists and the Public*, the institution of a "select association which could be started by a nucleus of economists conforming to the standards" laid down by him, that is that they should be free from any political, commercial, financial, property, or journalistic associations; they would be, he thinks, an austere body of chosen university lecturers. "There would attach to their opinions, which we believe would coalesce into virtual unanimity on all matters of popular controversy, an immense force" which would be expended in propagating truth through a journal, the independent organ of the society. Vain hope! Only a short time ago Mr. Keynes threw the apple of discord into the economic world, and Mr. Harrod, adopting his principles, has produced a new theory of the trade cycle. Now comes Mr. Hawtrey with a critical study "... with special reference to the work of Mr. J. M. Keynes, Professor Hayek, Professor Pigou, Mr. Harrod, and Major Douglas." In Æschylean phrase the messengers return reporting "oracles of varied meaning, obscure, and difficult to interpret," and the various seats of prophecy contradict each other. The quiet (if not always peaceful) kingdom of statistics seems preferable to those realms of strife!

Mr. Harrod follows Mr. Keynes in equating "savings" with "new investment," and denies that banks can alter the quantity of investment, since "they can only lend what is lent to them," and are "mere conduit-pipes." Here one must register dissent, which is fortified by Mr. Hawtrey's statements that "when the banks create credit they may stimulate active investment," and that "the adjustment of income by which saving and active investment are made equal *takes time*." Mr. Harrod also adopts Mr. Keynes's doctrine of the "multiplier," where he holds "the view that the general level of economic activity is determined by the amount of investment taking place, in such wise that, given the community's propensity to save, the activity must be just so great as to give people an income from which they will choose to save the amount that is required for that investment. The ratio of the increment of income (= the increment of output) required to make people save an amount equal to the increment of investment is called the Multiplier." To this he adds his own concept of the "Relation" between the demand for concurrently consumable goods and the demand for capital goods, the rate of advance of the latter depending on that of the former and changing in the same ratio. The three determinants which govern the rates of consumption and investment are the propensity to save as income changes, the shift to profit as output advances, and the amount of capital used in production. Mr. Harrod elaborately analyses the working of those factors, but does not entirely lose touch with realities ("when the *a priori* yields nothing, it may be well to revert to observed facts"). The trade cycle is inevitable; "the present advance in England is already far above normal (1936). . . . It is therefore highly probable that a situation will recur in which the operation of the Relation and the Multiplier will once again produce a full recession." He is sceptical about "the possibility of securing stable prices by purely banking methods" and wishes a non-political body to be set up for a long-range study of public works in relation to the trade-cycle, since their efficiency in maintaining investment will depend on their nature and on their being introduced precisely at the proper point in the cycle. The reader may be referred to Mr. Hawtrey's pages for criticism of Mr. Keynes and Mr. Harrod, which is sometimes sharp but not always unappreciative. One may add a regret that Mr. Harrod seems to be too shy to deal with time-lags, and also suggest that the inevitability of the trade cycle can be deduced from the fallibility of human nature. It savours too much of predestination to say: "According to the analysis here set out, the cycle would occur even if everyone had perfect foresight and behaved with perfect good sense; and it may be expected to become more accentuated."

Mr. Hawtrey is to be commended in that he is not one of those writers who consider obscurity of expression an ornament to exposition; he finds it quite possible to combine acuteness of analysis and comprehensiveness of view with simplicity of statement. The first 163 pages give a critical explanation of the classical theory of capital and interest, bringing them into closer relation with practical behaviour. Boehm-Bawerk's theory of the period of production and Jevons's "formula for expressing the rate of interest in terms of the marginal yield of capital" are first brought under review. Then the investment market is discussed, and here we may note with much approval the statement that "current savings may be further supplemented by bank advances obtained by speculators or speculative investors to buy securities." Mr. Hawtrey, as is well known, differs radically from Mr. Keynes in the importance he attaches to working capital held by producers and traders and to the influence exerted on its amount by the short-term rate of interest. One point may be taken up as an illustration. When general demand declines, traders require to hold less stocks, and thus find part of their working capital superfluous, and use it either to pay off bank balances or to buy securities, so that it becomes available in the long-term investment market. "The liquidation of working capital in itself tends to *relieve* the strain of declining demand. And in so far as the proceeds of liquidation, being passed on to the investment market, can be made to generate incomes through capital outlay, the relief is all the greater." Even if the state of demand does not warrant the extension of capital application on the existing lines, there are always "plenty of remunerative openings to be exploited for increasing capital equipment in proportion to man-power." If general demand increases there must be more working capital and probably extension of existing capital methods, so that there will be less capital for more intensive applications and the long-term rate of interest will rise. When the banks advance money on new issues in anticipation of future profits, "the investment market receives resources in excess of current savings," and the banks by their credit policy can thus make the holding of stocks with borrowed money more or less attractive. Short-term borrowing is also resorted to for the purpose of buying and selling securities, and thus a link is provided between short-term and long-term rates of interest, the expected time of duration of the short-term rate being important; both are, however, governed by a common cause, the state of demand.

In his fifth chapter Mr. Hawtrey applies these principles to the trade cycle, and finds that the theories which trace trade depression to a decline in investment fail to prove that this decline is of unique importance in producing a decline in general demand. He admits that "it would be difficult to put a limit to psychological influences in economic affairs," and emphasizes the power of the banks, by appropriate credit action, to slow down movements of expansion. In opposition to those who hold that the trade cycle is brought about by the long-term rate of interest, he points out that "in the half century up to 1914 there was only one occasion when the yield of Consols diverged by as much as ¼ per cent. from the seven years' moving average." Banks are unwilling to refuse loans for fear of losing customers, but the short-term rate does influence the legitimate trader if not the speculator. "The trade cycle is a monetary phenomenon because general demand is itself a monetary phenomenon," and as for the policy of public works as a cure for depression, "the intervention of the Government, with its public works, or other capital outlay, is a device for injecting money into the economic system. It is only called for at all on the assumption that the banking system cannot perform the necessary service." Might one not rather say that the Government steps in because the private entrepreneur has not himself sufficient resources and that he cannot persuade the banks that he is credit-worthy?

The rest of Mr. Hawtrey's book includes 69 pages on Mr. Keynes's *General Theory of Employment, Interest, and Money*, 35 on Professor Hayek's *Prices and Production*, 23 on Professor Pigou's *Theory of Unemployment*, 24 on Major Douglas's theories of social credit, and 16 on Mr. Harrod's *Trade Cycle*. He stoutly upholds the doctrine of monetary causes, and one reviewer at least finds himself in general agreement with his criticisms of his victims. This agreement does not imply the complete adoption of Mr. Hawtrey's opinions, and conceals heresies at which perhaps he would shudder.

H. W. M.

4.—*The Theory of Forward Exchange.* By Paul Einzig. London: Macmillan, 1937. 8¾″ × 5½″. xxi + 520 pp. 21s.

This work is an important and valuable contribution to a subject which has hitherto been very inadequately dealt with. The author explains that his "main object in producing a book which deals extensively with the broader aspects of Forward Exchange is to bridge the gap between theory and practice." He describes himself in his preface as standing somewhere half-way between practical specialists and theoretical economists—" each of those groups," he adds, " considers unflatteringly enough that I belong to the other."

The book is written in the language of the practical specialists. In one short passage (pp. 166–7) Dr. Einzig strays into the style of exposition familiar to theoretical economists, but he heads the section, rather apologetically, " Metaphysical Explanation of Interest Parities." But in general the ordering of ideas is that which comes naturally to the banker or trader considering the merits of a transaction—sometimes, it is true, a central banker or finance minister considering it from the point of view of the public interest. This method of approach does not necessarily impair the value of the book for the theoretical economist. For the theoretical economist is only too often handicapped by the difficulty of discovering how the mind of the practical trader works.

Nevertheless a little more theoretical exposition would have been helpful towards an understanding of the subject. Dr. Einzig recognizes handsomely the value of Mr. Keynes's treatment of the subject of forward exchange in his *Tract on Monetary Reform*, yet when he summarizes Mr. Keynes's " main points " he somehow contrives to obscure the essential ones (pp. 151–2).

The clue to all the intricacies of forward exchange is the simple principle that the forward buyer of a currency becomes a creditor in that currency and the forward seller a debtor. It is from this indebtedness that the principle of interest parities arises. The debts created by forward sales come into competition with other short-period debts in the money market, and all alike bear interest. " Interest arbitrage," which Dr. Einzig treats as just one in the list of transactions which give rise to forward exchange, is that type of transaction by which the market in short-period debts eliminates discrepancies or inconsistencies among rates of interest. It is part of the mechanism by which the market discharges its equalizing function. Speculation in exchange is likewise one of the instruments of the market, but of the foreign exchange market, not of the market in short-period rates of interest. It arises when there are speculators who think that forces are at work to cause a change in the exchange value of a currency unit, particularly when the unit is being maintained by official action at a value which does not conform to underlying conditions.

The monetary vagaries of recent years have supplied Dr. Einzig with numerous illustrations of the effects of speculation, which he has examined with both knowledge and acumen in the very valuable historical sections of his work One of the lessons to be derived from this experience is that speculation from time to time exhausts the resources available for interest arbitrage, so that the equalizing function of the market on short-period interest becomes ineffective, and forward exchange rates no longer conform to interest parities.

Dr. Einzig advocates the substitution of a " forward rate " policy for an "external" Bank-rate policy. That is to say, by relying on a manipulation of forward rates of exchange to induce an inflow or outflow of foreign funds when desired, "Central Banks would be able to make their Bank rate policy dependent solely upon internal considerations" (p. 400).

"An over-valuation of forward rates is just as effective in attracting or retaining foreign balances as is a higher Bank rate" (p. 399).

Has he not at this point allowed his enthusiasm to carry him a little too far? Suppose that the Central Bank of a country, which wishes to attract foreign money, resorts to "an over-valuation of forward rates" in order to avoid a rise of Bank rate. How is it to do so? It must itself enter the market and buy the currency of the country forward, or, in other words, sell foreign currencies forward. That tends to produce the desired over-valuation of the forward value of the former currency in relation to interest parity. The opportunity thus offered for interest arbitrage leads foreign operators to buy the country's currency spot and sell it forward. If the funds available for this purpose are sufficient, the over-valuation will be corrected; that will mean that the foreign funds attracted will be equal to the Central Bank's forward sales. If, as may be assumed, the spot foreign exchange offered all comes to the Central Bank, then the Central Bank's forward sales will be just offset by the addition to its spot holding.

If it operates in the first instance by way of swap transactions, buying spot exchange *pari passu* with its forward sales, it reaches the same situation. The inflow of foreign funds amounts simply to what the Central Bank has itself in effect *borrowed*—that and nothing more. The foreign arbitrageurs enter into the process merely to distribute the balances created against the foreign currency acquired by the Central Bank among suitable borrowers—a service that might have been performed by the Central Bank itself. And, it seems pertinent to ask, what is the advantage of this roundabout procedure? The acquisition of foreign exchange by the Central Bank does not really strengthen its position, so long as it is offset by equivalent forward sales. It could afford just as well to create additional notes and deposits against its own advances to traders as against the foreign exchange thus temporarily held.

Dr. Einzig's proposal is inspired by the assumption that one of the purposes of a high Bank rate is to attract foreign funds. For that purpose it is without doubt a clumsy instrument. "The monetary authorities," he says, "should realize that they can choose between restoring the trade balance by means of destroying trade through a high Bank rate and credit restriction, and neutralizing the effect of a trade deficit on the gold reserve by means of Forward Exchange manipulations." "Destroying trade" here simply means deflation, and deflation ought to be applied only when it is really required. A really *transitory* adverse balance must be met out of reserves.

The selling of forward exchange by the Central Bank is a device for drawing on these reserves without visibly diminishing them.

Dr. Einzig argues that the deception is legitimate, or at any rate as legitimate as some of the devices resorted to by central banks, with that object (pp. 346 and 389). And he points out that attracting foreign funds by a high Bank rate is just as "unsound" as attracting them by a favourable forward exchange (p. 403).

But surely the right inference is not that the latter device is desirable.

On the other hand, Dr. Einzig is quite right in urging that Central Banks ought not to be unwilling to intervene in the forward exchange market when circumstances require. Such intervention is often justifiable when the funds available for interest arbitrage are insufficient to adjust the forward rates to interest parity. The Central Bank can itself engage in what is in essence interest arbitrage. By completing the adjustment to interest parity, it *prevents* the international migration of balances (except those in its own hands). The forward sales of foreign currencies by the Austrian National Bank in the years 1923–6 were justifiable on this ground. "Even if there had been an open market for forward kronen, there would have been too many sellers and very few buyers of the currency, and the cost of covering the exchange risk on foreign credits would have been prohibitive" (p. 342).

R. G. H.

5.—*Industrial Reconstruction and the Control of Competition:* the British Experiments. By Arthur Fletcher Lucas, Ph.D., Associate Professor of Economics, Clark University, Worcester, Mass. London: Longmans, 1937. $8\frac{3}{4}'' \times 5\frac{3}{4}''$. xi + 384 pp. 15*s*.

Professor Lucas has written a very timely and instructive book. Like many other observers, he has been impressed by the profound changes both in social doctrine and in industrial organization which have been quietly proceeding during the last twenty years. "The movement," he says, "has its roots in the threatened collapse of the whole British economic structure, and has been predicated upon a renunciation not only of the traditional technique of industry, but also of the very assumptions upon which the nineteenth-century supremacy of British industry was based. It means a virtual denial of the classical concept of a static, self-equilibrating economy. It accepts the view that the automatic regulation performed by the price mechanism under free competition has signally failed to function." First, he rapidly surveys the progress from Elizabethan and Stuart monopolies to the domination of competition, acutely pointing out that British dislike for Government interference was greater than its confidence in the competitive system. Already before the War the competition of other countries had shaken the belief in the supremacy of British industry, and a movement towards co-operation of firms had set in to remove the profit-destroying effects of competition. After the War, British deficiencies were fully exposed, the weakness of the typically small British industrial unit was made evident, and the Balfour Committee declared that competition had proved an ineffective means of eliminating inefficient firms. The movement towards combination received a vigorous impetus, and went forward to the conception that in order to compete successfully, an industry must recondition itself as a whole, and that the individual units must submit to self-government by the industry as a whole. This belief was particularly strong in the basic industries, which were almost in a state of collapse, and the assistance of the Government was loudly called for.

"The policy of the Government towards industrial control has been based on the assumption that it is impossible for industry to continue to function in the national interests within the simple pattern of a *laissez-faire* economy," but it is a noteworthy concession to the old dislike of Government interference that the administration of the schemes that have been adopted has been left in the hands of the producers (with some provision for consultation with customers), the Government reserving only a general right of supervision. Professor Lucas then describes Government action in the coal, iron and steel, cotton, and agricultural industries, and, as far as we have been able to determine, his account is accurate up to the time of his writing. The only point at which a demurrer may be raised is his statement that the considerable amount of rationalization that has taken place in the iron and steel industry cannot be attributed to the establishment of centralized control. On the contrary, there seems to be little doubt that the influence of the executive of the British Steel Federation has, with the pressure exerted by the Import Duties Advisory Committee, been a major factor in bringing about a considerable measure of internal reorganization both of individual companies and of sections of the industry. Some of the more important private developments of co-operation within industries are also surveyed, and attention may be particularly directed to the success of the shipbuilding and flour-milling industries in eliminating superfluous firms; in the former case the success has been almost too comprehensive.

The three basic problems in any scheme of control are the determination of prices, the regulation of output, and the maintenance of efficiency, to each of which a chapter is devoted. "The absence of formal standards," Professor Lucas says, "is to be expected in view of the fact that British price-fixing policy is deeply coloured by the traditional monopolistic philosophy of charging what the traffic will bear, not as a narrowly selfish and short-sighted effort at exploitation, but rather as an attempt to secure the best prices that in the long-run will be permitted by underlying economic forces." It is especially impossible, he finds, to base prices upon "any abstract ideal of an inherently proper price" or upon "cost of production," but "it should not be assumed that price-fixing in British industry is pure caprice or that it is unnecessarily ruthless." That prices will be more stable under control is far from universally true, and while few examples can be found of unreasonable prices, there is little specific provision for safeguarding the public interest. The regulation of output is an "inevitable hit-or-miss procedure," of trying to bring output to a paying level, with suitable freedom for expanding firms and with possibilities of modification as demand changes. Consequently, "the general utility of control of output is rather narrowly circumscribed," and "in practice, the chief function of control has been to distribute output rather than to restrict it, to preserve the existing status of each producer by protecting him against an invasion of his market. No attempt is made usually to adjust output to existing or anticipated market conditions although indirectly some curtailment may result." With regard to efficiency, the real danger lies in the retention of incompetent firms in the industry. Finally, "it would appear that with the return of prosperity the traditional safeguards against monopolistic exploitation will have largely disappeared . . . the author . . . ventures to predict that if competition is permanently discarded, some alternative agency will be required to protect the public."

Thanks to Professor Lucas, we are, for the first time, able to compare the salient features of the different forms of control which have become so common and to estimate both their relative efficiency and their dangers. This is a very valuable book.

H. W. M.

6.—*Bank of England Operations, 1890–1914.* By R. S. Sayers. London: P. S. King, 1936. 7½″ × 5¼″. xxiv + 139 pp. 6*s*.

Mr. Sayers has aimed at writing not a monetary history nor a history of the Bank during the period, but merely a study of its operations in relation to the working of the pre-war gold standard. The work is based largely on the files of the *Economist* and the *Statist* and publications of the U.S.A. National Monetary Commission (1910), supplemented by a process of deduction or divination.

After an historical and general introduction, there is a detailed explanatory discussion of the various methods employed by the Bank, when the necessity arose, to force market rate up to or even beyond its normal effective relationship with bank rate. This is followed by a well-documented story of the so-called gold devices, which were similar to, but more restricted and perhaps less well known than, the weapons used in foreign centres to avoid undesired changes in bank rate. In the chapter on continental support of the Bank, the supposedly gratuitous character of French aid during periods of crisis is critically discussed.

In the course of the book's hundred or so pages, many points hitherto obscure or mysterious to all but the expert are described and explained in a manner notable for its restraint and freedom from dogmatism. In fact, it is seldom one reads a book on banking with aims and claims so unpretentious yet so admirably and completely fulfilled.

C. O. G.

7.—*The Problem of Investment.* By F. I. Shaffner, Ph.D. London: Chapman & Hall, 1936. 9″ × 6″. 357 pp. 15*s*.

Since the War, in America in particular, measureless loss and misery have been experienced through investment in securities which have subsequently proved worthless. In this interesting and provocative book Dr. Shaffner of Harvard examines the status of the present-day American investor with respect to his holding, no matter where it is invested. His purpose is to show the public the complexities and risks, frequently hidden and unrealized, that surround them. Especially he wishes to attack the confidence which is reposed in securities which have been graded for risk upon their face value alone.

First he examines the probable repercussions on the investor of recent tendencies in investment finance. The two chief factors in the situation are the growing dominance of giant units in business, and the rapid increase in numbers and decrease in average holding of the investors. In 1929 out of 500,000 non-financial corporations 0·07 per cent. controlled nearly half of the national corporate wealth, without regard to indirect control by large companies over small. These great corporations dominate the Stock Exchange, and are at the same time relying more and more for their financing on the savings of the public. In such circumstances the private investor has become insignificant. Security ownership and control have been separated, and every method has been used to make the separation more complete: The holding company—Dr. Shaffner cites an instance where an equity interest of less than 0·3 per cent. of a total of $12,000 million secured control for financial manipulation in the interests of the few; non-voting stock; protective committees; and the manipulation of different types of security within a company. Control has passed to the "big business" men at the head, who, on Dr. Shaffner's showing, seem susceptible to every kind of human frailty over the handling of money. The banks, who might have been expected to be a safeguard to the investor through the selection of the foreign and domestic securities they sponsored, appear frequently to have shown a dubious honesty, or, to say the least, an arrant negligence in their work. Indeed, from the perfectly horrifying scandals which Dr. Shaffner reveals, it is almost surprising that the ordinary investor dared to invest at all.

The fallacy of safety in mortgage bonds is next exposed. Dr. Shaffner traces the legal position of the mortgagor since Roman times through American law. Mortgages are considered to be less risky because the bonds are backed by specific property that can be seized and sold in event of a default, but in actual practice this backing can be made useless. The evils of Federal receivership, for example, are especially well brought out. Any large corporation can go into voluntary receivership, where it cannot be sued by its shareholders or anyone else, whenever there is an action pending against it, regardless of whether its assets outweigh its liabilities or no. When the storm has blown over it can emerge. The Courts of Equity provide little protection, and none that can be relied upon. Even should the company be forced into financial reorganization recent history shows that the position of the mortgage bondholder is completely insecure, the more so as the business of reorganizing is extremely lucrative to financial institutions. Dr. Shaffner concludes that the mortgage is as safe as any other bond, and not more. He recommends its abolition as misleading to the investor.

To round off his treatment of the investors' difficulties he considers the business cycle in relation to securities. This is the least satisfactory section of the work. He studies the various explanations of the cycle given by eminent economists, and achieves the considerable feat of making Mr. Robertson, Mr. Keynes and Mr. Hawtrey produce a single unanimous theory. His own analysis is confused, and certainly would not be accepted by every economist. From it he concludes the business cycle with its attendant repercussions on the security-holder to be inevitable and likely to increase in severity.

With this dark outlook for the future, the author in a concluding section reviews the legal safeguards that the investor has to rely upon. He describes the good work that the Roosevelt administration has done in regulating big business and finance, the federal laws regulating the sale and issue of securities, commonly known as "blue sky" legislation, and the Securities Exchange Act of 1934. The only other safeguard is that of expert guidance. Despite a statistical investigation that appears to show investment experts to be more often wrong than right, he gives as the final lesson of his book that at the present day the control of investments has passed out of the capacity of the layman, who should no more attempt to handle them by himself than to cure his illnesses without expert advice.

This book can be recommended as both interesting and amusing reading and as an essential aid to the study of American company finance. The style is readable. Finally, the reader is left wondering what results a similar enquiry for England would yield. R. W. S

8.—*Trade Revival in a Depressed Area.* By D. Caradog Jones. The University Press of Liverpool, 1937. $8\frac{3}{4}'' \times 5\frac{3}{4}''$. 72 pp. *2s. 6d.*

This, the fourth volume of the "New Merseyside Series," is an excellent example of the way in which brevity can be combined with a cogent argument.

From an examination of the trends of trade and of unemployment during the last ten years, the conclusion is reached that improvement of economic conditions in Merseyside is proceeding at a much slower pace than in other parts of the country. Thus the present period of general relative prosperity cannot absolve authorities from the continued consideration of Merseyside as a particular problem of a depressed area. In the four chapters of the first part, the decline in the trade of the World, the United Kingdom, and Liverpool over the past ten years is indicated. The effect of this decline on unemployment with special reference to the Merseyside is discussed in the six chapters of the second part. By contrasting local unemployment by industry, age and sex, with that of other areas the relative prosperity of the Southern and Midland counties and of London is very apparent.

The total number unemployed in the Merseyside in 1936 was

92,000, of which it is estimated that 34,000 can be regarded as normal unemployment, while 18,000 are attributed to "abnormal time" unemployment (*i.e.* due to the critical times through which we have been passing), leaving 40,000 attributed to "abnormal place" unemployment (*i.e.* due to conditions peculiar to the place itself). Thus of the total unemployed, over 43 per cent. tend to remain unaffected by improvement in national economic conditions. The general conclusions in the final chapter emphasize the need for the special consideration of Merseyside as a depressed area the difficulties of which cannot be solved by reference to a wave of current prosperity. R. F. G.

9.—*Business Statistics and Statistical Method.* By H. J. Wheldon, B.Com. (Lond.). London: Macdonald and Evans, 1936. 8¾" × 5¾". ix + 223 pp. 5*s.*

Statistics for Professional Students. By R. L. A. Holmes, B.Com., London: Pitman, 1936. 8¾" × 5¾". xii + 163 pp. 5*s.*

A Concise Manual of Statistics. By Clement Burton. London: Gee, 1937. 8¾" × 5¾". ix + 164 pp. 7*s.* 6*d.*

The first of these three books has a distinctly business bias. It is specially intended to serve "the business men and women of the future," and consequently relies for its examples very largely on figures of output, factory progress, and sales. The third book has special reference to the requirements of students for municipal examinations, and therefore makes much use of municipal material in illustrating the practical aspects of statistics. *Statistics for Professional Students* occupies a midway position, drawing on business records and general economic data impartially in its endeavour to cater for those entering for the professional examinations.

Mr. Wheldon's book begins by discussing briefly the nature and value of business statistics, and proceeds to consider the compilation and sources of data. Rather less than four pages are devoted to the chapter on "Statistical Sampling," which indicates the brevity with which certain aspects of the subject are treated. In dealing with the presentation of statistical information, emphasis is laid on the physical considerations involved, *e.g.* size of table, headings, effective rulings. One feels that the author has himself suffered from material served up in unreadable form, and these very elementary considerations cannot be too strongly stressed. Attention is also paid to the contents of the table, which are even more worthy of emphasis, for no amount of careful ruling can atone for ill-derived data, or for too little or unnecessary detail. Tabulation is concluded by a chapter on mechanical sorting. Graphic methods, approximations, averages and dispersion are treated at relative length, while the chapter on correlation gives an adequate account of the arithmetic of the process.

The value of published statistics is given due emphasis, but it is incorrect to say "The Census of Population . . . is now to be taken every five years" (p. 165). The list and brief explanations of the most important series of published economic statistics appear to cover all that is commonly required, with one exception—no mention appears to be made of the annual census of output undertaken by the Board of Trade under the Import Duties Act.

Mr. Holmes's book is concerned with statistics as such. It is a very good introduction to the subject for those whose time and mathematics are insufficient for the standard and larger works. The collection and tabulation of data are naturally considered in the opening chapters. A special word of thanks is due to the author for the way in which he speedily dismisses " cartograms " " pictograms " and " pie charts " as belonging to the art of propaganda rather than to the science of statistics. The chapter on graphs, considering the limitations of the book, is particularly good; frequency tables and curves are also excellently discussed. Dispersion and skewness are adequately treated, but it is impossible to give more than an outline of correlation in a short chapter of an elementary work. The determination of trends and seasonal variation should give no difficulty to the student who carefully reads the chapter on time series, and, realizing that his book is but an introduction to the subject, the author rightly refers the reader to more advanced works for information on errors in sampling. The final chapter describes mechanical tabulation, and the two appendices are devoted to a short bibliography and the syllabuses of statistics for the various professional examinations respectively. This book can be confidently recommended to the elementary student who wishes, or has, to acquire familiarity with statistical method. Two small mistakes need correction before the second edition is published. On page 84 " c " is omitted from the numerator of the formula, and the base year of the Board of Trade index number is no longer 1924 (p. 130 and Table 33).

Mr. Burton's *Concise Manual of Statistics* is intended to give assistance particularly to those studying for the examination of The Institute of Municipal Treasurers and Accountants (Inc.). It follows the general pattern in beginning with the collection of data and their classification and tabulation. Accuracy and approximation are covered largely by reference to biassed and unbiassed errors and the arithmetic involved in dealing with round numbers. Under the heading of " Diagrammatic Representation," pictograms, bar diagrams, cartograms and graphs proper all receive brief mention. The illustrations entitled " miscellaneous methods of drawing attention to facts " cannot, however, deserve a place in a textbook on statistics. Although the " normal curve of error " is given as one of several sub-headings to Chapter V, its treatment appears to be restricted to six lines on p. 48, and the vertical scale in Fig. 13 contains a gross error. Averages are discussed at length in a separate chapter. It is, however, customary to place a moving average against the middle observation of the group concerned rather than opposite the last item of the group. The reviewer feels that the author has been over-anxious to justify the title of the book and that it consequently suffers from too much compression and too little explanation. For example, it is stated that the use of the index numbers attributed to Sauerbeck, the *Statist*, the *Economist* and the Board of Trade, is " To estimate the level of prices." The inclusion of the word "wholesale," would improve this brief description. There is moreover no point in treating the indices of Sauerbeck and of the *Statist* as two distinct index numbers. The book concludes with a chapter on municipal statistics, one on the use of machines, and finally one devoted to a list of published statistics.

R. F. G.

10.—*The Railway Worker.* By G. M. Rountree. Toronto and London: Oxford University Press, 1936. $8\frac{3}{4}'' \times 5\frac{1}{2}''$. xx + 364 pp. 12*s*. 6*d*.

It has been said that Canada is built upon the railway, and in that country of distances, where transportation is chiefly concerned with the movement of raw materials in bulk, it is clear that the importance of her three-thousand-mile railway system cannot be greatly diminished by the development of other means of transport. But there can be no doubt that the competition of road and air services will have an increasing effect on the volume of railway labour, and taken in conjunction with the possibility of amalgamation of the two principal systems, involving the abandonment of duplicate and competitive mileage, may well lead to a serious extension of unemployment. The labour force, reduced by about 36 per cent. during the slump, is subject also to fluctuations resulting from seasonal and technical causes, and in this work, the fifth of the Social Research Series of the McGill University of Toronto, these problems of the employment structure are examined.

The industry covers almost every conceivable occupation, and the relative effect of long- and short-period variations cannot be determined without an analysis of the vast range of skilled and unskilled operations inherent in railway working. Part I describes in considerable detail the complex organization of the operating and maintenance departments and outlines the trade-union system. This is, for the most part, built upon a brotherhood or craft basis, and contrasts strongly with the industrial combinations of the British Railways. Such affiliation as exists between the craft associations does little to reconcile internal differences, and there appears to be ample scope for a greater degree of federation. It has, however, been possible satisfactorily to establish machinery for dealing with the interpretation of agreements, and considerable success has attended the efforts of the joint boards formed for this purpose. This is attributed by the author to the cordial relations between the parties, and a general desire for peaceful settlement. Statutory machinery has been set up to deal with major questions such as the revision of agreements, but this appears to have given no more satisfaction than that provided in this country by the Railways Act of 1921, and its supersession by a system relying on the capacity of the industry to compose its own differences seems inevitable.

Part II opens with an analysis of seasonal fluctuations in the operating and maintenance grades, and it is contended that this factor is to a considerable extent under the control of the industry itself. The vast agricultural traffics are naturally susceptible to this influence, although some relief is afforded by the necessity for maintaining minimum services. The geographical and occupational differences in seasonal variation are well brought out, and exploration of the possibilities of greater mobility of labour between groups and districts is recommended. By the application of twelve-monthly moving averages the data employed in the seasonal analysis have been utilized to study cyclical fluctuations, and here again regional and group incidence discloses some interesting differences. There has been some improvement during the past few years, but this problem is by no means peculiar to Canada, and the author's contention that any attempt at solution must be preceded by a detailed knowledge of the characteristics of the unemployed has more than a local application.

Improved methods of handling traffic and general mechanical progress have frequently a more than temporary effect upon employment, and the comfortable doctrine that the ultimate adjustment of industry will enable the displacements to be absorbed in other directions is contested. This aspect is closely linked with the difficulties arising from amalgamations and reorganization, and it is unfortunate, but true, that it is a matter of the "national economy as a whole rather than a specific railway problem."

Part III surveys the field of wages and earnings, the many obstacles to mobility of labour (notably the rigidity of the trade union regulations) and efforts by co-operation between unions and management to harmonize the discordant themes of reduced unit cost and continuity of employment. The concluding chapters comprise a summary of the short- and long-run problems. As regards the former, it is shown that efforts by the industry itself, however vigorous, can bring only partial alleviation, and must be supplemented by measures of greater scope than the restricted unemployment insurance introduced by the federal government in 1935. Consideration of the long-term factors leads to the suggestion for a comprehensive and detailed survey by the State of the position in the railway and allied industries with an extensive development of the employment exchange service. Changes in the arbitration machinery are recommended, and "some form of unified administration must be worked out." Lest it be thought that the mountain of statistical data in this work has brought forth the proverbial mouse, we would emphasize the author's conclusion—"the worst of all alternatives will be to do nothing."

Reference to the data is facilitated by a series of well-constructed tables and charts, and the sources and statistical treatment are fully defined. A useful bibliography is appended. H. G. L.

11.—*Pension and Widows' and Orphans' Funds.* By D. A. Porteous. (Institute of Actuaries Students' Society's Consolidation of Reading Series.) Cambridge University Press, 1936. 8½" × 5½"; xii + 111 pp. *7s. 6d.*

This book forms a welcome addition to the three volumes which have already been published in the Institute of Actuaries Students' Society's Consolidation of Reading Series. The book is intended primarily for those who are studying for the Fellowship examination of the Institute of Actuaries, and, as such, naturally contains a great deal of technical matter which is not likely to be of particular interest to the general reader of economic and statistical works. Some portions of the book are, however, of general interest, particularly to employers and others who may be concerned in establishing pension funds for their staffs.

The author points out in his preface that pension funds and the related actuarial technique bring the student into an entirely fresh field and introduce new conceptions to which his previous studies provide little or no guidance, and that it is difficult therefore for him to know where to begin. He quite rightly also remarks that the student will find as his most valuable asset the employment of plain common sense, and he closes his preface with a valuable piece of advice to the student, namely, that he should endeavour to find an actuary who is engaged in pension fund work—and help him.

Chapter I is a short one, devoted to a description of the various types of scheme, and is followed by two chapters which deal with the technical principles and methods to be employed. As was only to be expected of an author who is an actuary with a considerable experience not only of pension fund valuations but also of the teaching of this subject to actuarial students, these chapters are in every way admirable.

Chapter IV is entitled "General Principles," and may be regarded as having the widest general appeal. In it will be found reasons for the establishment of a pension fund, discussions of a suitable basis for fixing the method of determining the amounts of the pension and a summary giving the advantages and disadvantages of the various methods. The author makes it clear that where the conditions are favourable—that is to say, where the employer is not unduly hampered for funds to place at the disposal of the pension fund—some form of pension based upon the average salary of the last few years of service is to be preferred to the method of basing the pension upon the average salary throughout service. It may be remarked that a compromise is sometimes found by dividing the pension into two parts, the one being dependent upon the average salary throughout service, and the other upon the average of the last few years. The closing paragraphs of the chapter deal with pension schemes operated through the medium of an insurance company, and outline the advantages and disadvantages of this method of establishing a fund as compared with a private fund established under a trust deed. This is a controversial question, and the author deals with it in a judicial and impartial manner. It would be out of place to reopen the controversy here, but the following sentence may perhaps be quoted: "The popularity of insurance office schemes may perhaps seem to be due in some measure to the probability that some of the employers concerned are not fully aware of the advantage of the private type of scheme."

Chapter V deals with the legal aspects of the subject, and under the heading "Income Tax" the author points out that the annual contributions paid by the employer and the employees are allowed to be deducted as expenses in computing their taxable incomes, and that the interest income of a fund which complies with the requisite conditions, and thus secures the approval of the Inland Revenue Authorities, is exempted from the payment of income tax, privileges which are of course most valuable.

The chapter on valuations (Chapter VI) contains a general survey of the valuation basis, and under the heading " Valuation Results " contains the following remark, which, although it may come as something of a shock to the layman in actuarial matters, will be endorsed by actuaries who deal largely with this type of work: " The results of any actuarial valuation of whatever type cannot be regarded as exact; it is an estimate which events may or may not prove to have been approximately correct, and the word ' exact ' is probably less apt when applied to a valuation of a superannuation fund than in the case of most other types of actuarial work." The valuation is to be regarded, the author remarks, as a periodic check to enable suitable corrections to be made to previous assumptions before any divergence in the actual experience of the fund from those assumptions has had time to produce embarrassing results.

New funds form the subject-matter of Chapter VII, and the method of dealing with the pension to be granted in respect of service rendered by employees before the establishment of the superannuation scheme constitutes an important section of the chapter. The author suggests methods for reducing the cost falling upon an employer if the adoption of an ideal scheme should be found to be too expensive.

The next chapter deals with the superannuation of public employees and with the schemes of Local Authorities, a substantial part of the chapter being devoted to the Local Government and other Officers' Superannuation Act, 1922. The provisions of this Act will be modified in many points of detail if the Local Government Superannuation Bill now before Parliament becomes law, but the scale of pensions which it was thought suitable to adopt in 1922 remains unmodified—namely a pension equal to $\frac{1}{80}$ of the average salary during the last five years of service for each year of service, with a maximum pension of $\frac{40}{80}$ of such average.

Part II of the book, consisting of chapters IX–XII, covers widows' and orphans' funds. The first of the four chapters is introductory to the subject, and the remaining three deal with the two standard valuation methods and are mainly of technical interest. The appendix to the book contains extracts from the more important Acts and Statutory Rules and Orders affecting pension funds.

This book should undoubtedly be of very great assistance to the actuarial student. C. H. L. B.

12.—*Musikstatistik*. By Dr. Leo Wilzin. (Schriften des Institutes für Statistik insbes. der Minderheitsvolker a.d. Univ. Wien. Reihe C. No. 1.) Wien; Deuticke, 1937. 8¾″ × 5¾″. 119 pp. M. 4.

The author is here attempting to lay the foundations of a systematic statistical treatment of the arts in so far as they form part of the cultural and economic aspects of social science. Choosing music to begin with, partly from personal predilection, partly as the art whose subject-matter appears the most amenable to statistical handling, he indicates the data required and outlines a method of analysis. The material is classified as musical production, reproduction, and consumption. The statistics of production will consist of a numerical analysis of the works of the principal composers in given periods, showing the relative frequencies and average length of the different species of compositions, with weighted indices of importance based on an ideal "standard work," the relative frequencies of various time-measures, instruments, and tonal keys employed in the periods compared. Owing to the values being necessarily quantitative, it is not clear that the results will give a true picture of musical development. The statistics of reproduction and consumption, which are treated together as inseparable aspects of a single phenomenon, seem more significant. They refer, first, to personal musical culture, the data for which are the numbers of music libraries and their recorded transactions, and the numbers of private music societies, in which reproducers and consumers are identical. Next come statistics of "direct reproduction," which relate to the numbers, employment, and earnings of salaried executants, and finally we come to "market music," *i.e.* concert performances, recitals, operas, and so forth, the statistics of which are of both cultural and economic importance, but since the output, like that of any other market commodity, is subject to the laws of supply and demand, it can only be measured by the box-office. Accordingly, the data will consist of the numbers of times that given works, given classes of works and works by given composers are performed during given periods, and of the numbers of establishments catering for different types of music-consumers. Radio and other mechanically reproduced music should be included here, but, naturally, figures are not available and could be obtained only by means of questionnaires. Confessedly, the results of the statistics so far envisaged can lead to no general conclusions, but the author is hopeful that in time sectional indices may be combined, by some such methods as are employed by economic statisticians, to form a barometer of musical activity and musical development, and that it may in time be expanded so as to embrace all the arts. A bibliography of relevant literature is appended to the text, and, in addition to the various skeleton schedules, some actual tables of opera performances are given. They reveal some interesting facts: in the decade 1901–2 to 1910–11, of the 33 operas which were performed over 1000 times in Germany, *Carmen* was the most frequently given (3956 times), *Lohengrin* and *Tannhaüser* came next, *Meistersinger* and *Walküre* occupied the 14th and 19th places respectively, below *Mignon* (4th), *Cavalleria Rusticana* (7th), and *Il Trovatore* (8th). On the other hand in the same period Wagner heads the list of composers with 17,365 performances, while Verdi, who comes next, had only 6798. One would like to see parallel figures for the last decade.

C. T.

13.—*Umriss einer Geschichte der Preise und Löhne in Deutschland vom Ausgehenden Mittelalter bis zum Beginn des Neunzehnten Jahrhunderts.* By M. J. Elsas. Leiden: A. W. Sijthoff's Uitgeversmaatschappij N.V. 1936. Volume I, 10″ × 6½″. x + 808 pp. Fl. 12·50.

Dr. Elsas is a member of the International Scientific Committee on Price History which was formed in 1930 under the chairmanship of Sir William Beveridge. He undertook the collection and analysis of the German material and deals in this volume with prices and wages from 1399 to 1820 in three South German towns, Munich, Augsburg, and Wurzburg. His main conclusions are: prices increased until about 1622–23, then declined until about 1672 and thereafter rose again; real wages decreased in the course of the sixteenth century until the beginning of the Thirty-Years' War, but rose in the course of the seventeenth century, during a period of great impoverishment. Dr. Elsas is inclined to consider changes in population as the decisive factor in determining the trend of prices and wages. Prices rose when the population of the towns increased because it became necessary to make use of poorer or of more remote soils in order to satisfy the demand for food; real wages rose when the population of the towns decreased because labour became scarce.

The main difficulties in preparing such a volume, it seems to the reviewer, consist first in presenting the collected price and wage data in such a form that the reader will not regret not having access to the sources from which the data were taken, and secondly in supplementing the figures with the details about coins and currency, weights and measures, types of prices and wages, description of goods and of occupations, etc., which are necessary to enable the reader to interpret the price and wage tables correctly. Dr. Elsas has overcome these difficulties in a masterly way. But he has done more than that. In analysing the results of his painstaking studies he has made use of his profound knowledge of recent economic trends, and has provided us with a book which not only supplies the needs of the most exacting student of the economic history of past centuries, but also will be of great value to everyone interested in the economic events of to-day.
R. R. K.

14.—*L'Enseignement économique en France et à l'étranger.* Par Charles Rist, Gaëtan Pirou, etc. Cinquantenaire de la Revue d'Économie Politique, 1887–1937. Paris: Recueil Sirey, 1937. 9¾″ × 6¼″. 262 pp.

The *Revue d'Économie Politique* was founded by Charles Gide with the aim of infusing new life into the study of economics in France. The present editors, MM. Charles Rist and Gaëtan Pirou, have commemorated the fiftieth year of its existence by the publication of a volume the purpose of which is to review the present state of economic teaching in France and to examine its adequacy in relation to the needs of to-day and in comparison with the practice of other countries. The present very interesting and informative survey is confined to Europe, but it is hoped to deal with the United States in a later work.

The characteristic features of the teaching in different countries are discernible in the arrangement of the descriptive material. While in both the French and English sections the chapter headings are those of institutions, the French titles refer exclusively to institutions in Paris. the English to widely scattered universities; the German division is into types of institution—namely, Universities and Commercial Colleges, the Italian according to subject-matter—political economy and public finance, special centres of instruction being now devoted to the latter. Two short chapters on the teaching given in Belgian and Austrian Universities, respectively, complete the objective portion of the survey. There follows a chapter of "conclusions" by M. Henri Laufenburger, who compares the methods followed in France and abroad, considerably to the disadvantage of his own country. The underlying intention of the survey seems, indeed, to be to convince those concerned that, in spite of the zealous efforts of M. Rist and his successors, the teaching of economics is still comparatively backward in France, and to stimulate the initiation of measures for its improvement. The chief criticisms on the teaching given in France are directed to its extreme centralization and its academic segregation in the Faculties of Law, to the confinement of instruction to the lecture-room, and to the neglect of the ancillary study of statistics. The seminar studies of Germany and England and the institutions in various countries for economic and business research, which M. Laufenburger surveys in the subsequent chapter, are held up as instructive examples.

The descriptive sections, which form the bulk of the book, are contributed by some of those actually teaching in the institutions surveyed. For France, M. Pirou describes the economic degree conferred by the Faculté de Droit, M. Landry writes of the École Pratique des Hautes Études, paying tribute to the work accomplished there by the late M. François Simiand, for whom a Chair of Economic Statistics was created. The remaining chapters are on the École Libre des Sciences Politiques (M. Rueff), various technical colleges (M. Divisia) and the schools founded by the Paris Chamber of Commerce, the latest of which is the Centre de Préparation aux Affaires, opened in 1930 for the training of advanced students in the handling of concrete problems arising in business (M. de Moncetz). M. René Roy contributes a chapter on statistical teaching.

The English section, which follows and is almost as long as the French, covers the teaching given at five centres. These are the London School of Economics (by Professors Plant and Robbins, jointly) and the Universities of Oxford (Mr. R. F. Harrod), Cambridge (Mr. Austin Robinson), Liverpool (Professor Allen), and Manchester (Mr. Jewkes). The chapter on the London School consists of a clear and detailed account of its organization and methods of teaching. The writers dealing with the University centres, however, and Mr. Robinson in particular, devote some considerable proportion of their space to discussing the type of economic doctrine taught and some of the eminent persons who assisted in its formation. It will be noticed that although the section is headed "Grande Bretagne," there is not even a mention of Scottish or Welsh Universities, nor of the Economic Departments of any English Universities other than the five set out above. Certain of these are, however, referred to in M. Laufenburger's chapter on research institutions.

The chapters on German teaching bodies are by Professors Gerloff and von Bissing respectively, the Italian authors are Signori del Vecchio and Borgatta, M. Ansiaux deals with Belgium and Professor von Strigl with Austria. The whole of the text relating to foreign countries has been very ably translated into French.

C. T.

15.—*Other New Publications.**

Brunner (*Edmund de S.*) and *Lorge* (*Irving*). Rural Trends in Depression Years. A Survey of Village-centred Agricultural Communities 1930–1936. New York: Columbia University Press, 1937. 9″ × 6″. xvi + 387 pp. 16*s.* 6*d.*

[This is the third survey to be taken, under the same director, of the same 140 villages. (An agricultural village is defined here as "an incorporated center of more than 250 and less than 2500 population situated in the midst of a farming area for whose inhabitants it supplies the usual commercial and social services.") The first and second surveys were published in 1927 and 1933 respectively. The purpose of the present one is to give the results of the changes in rural social life in the United States in the period under discussion and to trace the life story of the communities through a third phase of their development. The changes which have taken place in agriculture, in the population, in the relations of village to country, and in business, industry, banking, education, religion and social life are discussed at some length. The book includes more than a hundred tables, two appendices, one of which briefly describes the methods used by the investigators, and an index.]

Gurtner (*Josef*). Die katholische Kirchenmusik Österreichs im Lichte der Zahlen. Baden: Rohrer, 1936. 9″ × 6″. 311 pp.

[This investigation was undertaken by Dr. Gurtner, of the Bundesamt für Statistik, in order to assist the Austrian bishops in regulating the liturgical music of their respective dioceses according to the requirements of papal authority, and the Archbishop of Vienna, in a brief preface, expresses his gratitude for the detailed statistics obtained. The author has collected and tabulated very full information respecting the musical practice of churches in Austria during the year October 1932–September 1933. His subject-matter is treated under the heads of Organization, Music used in the services, Church music performed elsewhere, Organs, and Bells. The chapter on Organization deals with choir-masters and organists—their duties, pay, and hours of work, sex, and education—with choirs, choir schools, church music guilds, etc. The music used is analysed according to kinds (choral, organ, orchestral, folk- and art-songs, etc.) and composers, and the number of churches in each diocese in which each was employed: every Latin mass used is given a separate entry. Organs are considered with respect to age, construction, use and builders; bells under the heads of age, founders and peals. Four appendices give respectively the text of the questionnaire from which the figures were obtained, a list of Church Music societies, the names of the churches with organs built before 1800, and of those which have organs with more than fifty stops.]

---

* *See also* "Additions to Library," p. 487.

Hamilton (*Gordon*). Social Case Recording. Published for the New York School of Social Work by Columbia University Press. New York, 1936. 8½″ × 5½″. vi + 190 pp. 12*s.* 6*d.*

[Social case workers by the nature and organization of their work are particularly dependent on case records. This book "undertaken because of the constant demand in the field of social case work for illustration and discussion of practices in recording" is concerned with the format and structure of the records, chronological entries and summaries, diagnostic and evaluational material, letters and reports, and differences in style. Special chapters are devoted to "Problems in Recording" and "Problems in Relief Recording." A bibliography and an index are included.]

Hoffman (*Frederick L.*). Cancer and Diet. With Facts and Observations on Related Subjects. Baltimore: Williams and Norgate Co., 1937. 8¾″ × 5¾″. xi + 767 pp. $5.

[This large volume embodies a study of diet in relation to cancer on which the author has been engaged since 1931. The first three parts, "Dietary Theories of Cancer" (covering the period 1200–1935), "The Modern Diet," and "Cancer Metabolism," are almost entirely compiled from other publications, (not all of equal scientific value). They serve as an introduction to the fourth and main part, the study itself. This consists of a collection of "General Facts and Observations" obtained by means of questionnaires, covering about 90 items, sent out to 2,234 cancer patients and 1,149 non-cancerous controls. The questions included race, civil state, locality, weight, general health and pathological history, as well as dietary habits and preferences in general and with regard to a number of specified foods and drinks. The replies are tabulated in 144 sets of figures and discussed in the text. In Part V, a brief "General Summary and Conclusions," Dr. Hoffman expresses himself as "absolutely convinced" that the underlying cause of cancer is to be found in an excessive intake of foods, "especially those of a high organic or mineral content or generally of an alkaline base instead of acid." Part VI, Appendices, contains the text of the questionnaire and summary tables of the figures obtained from the replies, followed by a discussion of hydrochloric acid and lactic acid in relation to gastric cancer. Indices of authors and subjects complete the book.]

Holford (*W. G.*) and *Eden* (*W. A.*). The Future of Merseyside: Town and Country Planning Schemes. Liverpool: University Press, 1937. 8¾″ × 5½″. 84 pp. 2*s.* 6*d.*

[This is the latest number of the New Merseyside Series to be published. Since planning implicitly means having regard to future circumstances, it follows that town planning for the Merseyside cannot be confined to the immediate neighbourhood of the area at present known as Liverpool. The authors therefore take a wide view of their country and apply their arguments to an area covered by the Merseyside Survey. This, however, involves four county boroughs and five urban districts, and the conclusion is reached that planning for the Merseyside in any real sense of the term will remain impossible until a radical change is effected in the present system of local government.]

Janko (*Jaroslav*). Základy Statistické Indukce. Praje, 1937. 9¼″ × 6½″. 224 pp. 40 *Kč.*

[This is a treatise on the Elements of Statistical Induction by the State Professor of the Institute for Higher Technological Studies, Prague. A slip giving the translation of the Contents page enables us to give an outline of the treatment by transcribing the main headings as follows:—I. Fundamental Notions. II. Principal Means of Solution of the Problems of Estimation; One-dimensional frequency distributions; Two- and more frequency distributions. III. Theory of Sampling, Principles of Solution or Distribution Problems; Characteristics of a universe of means of samples; Characteristics of a universe of variances of samples; Characteristics of samples drawn from a normal universe; Tests of significance; Analysis of variance; Representative methods. IV. Controlling Production by Means of Sampling. It is regretted that ignorance of the Czech language prevents our giving any critical estimation of the work, but the subdivisional headings of the various sections given above indicate that the treatment is thorough, orderly, and up-to-date.]

Owen (*Launcelot A.*). The Russian Peasant Movement, 1906–1917. London: P. S. King, 1937. 8½″ × 5½″. xix + 267 pp. 12*s*. 6*d*.

[Sir Bernard Pares in a foreword to this book says ". . . . the most important of all the gaps in our direct knowledge of the historical details of the Russian revolution of 1917 is the subject of this book, the agrarian revolution of that year, in which the peasants created an accomplished fact by simply appropriating the whole of the land." In writing the thesis of which the book forms a part, Dr. Owen had access to, among other material, the reports of the day-to-day events of the revolution sent in from the various localities to the Provincial Government (March to November 1917). After a short historical introduction the book describes the causes of the new (Stolypin's) governmental policy in agrarian affairs; his agrarian legislation and its results; Lenin and the peasant movement; the important part played in the October revolution of 1917 by the widespread social dissolution in the villages; the main achievement of the peasant movement of 1917; the Land Decree of October 26th, 1917, with Lenin's own post-revolutionary comments upon it. The book includes a glossary, a bibliography, and an index.]

Pabst (*W. R., Jr.*). Butter and Oleomargarine: an analysis of competing commodities. Studies in History, Economics and Public Law, No. 427. New York: Columbia University Press. London: P. S. King, 1937. 8¾″ × 6″. 112 pp. 6*s*. 9*d*.

[" The purpose of this book is to investigate the interrelationships of these two commodities in the light of recent theoretical work and through the application of modern statistical technique." In 1870 Mège-Mouries established a margarine factory in Paris, and 1871 saw the beginning of the manufacture of oleomargarine and the recognition of the new and modern dairy industry. The development of both industries is described. The policy of the American Government to support and subsidize agriculture has resulted in butter-making being protected from the industrialized production of oleomargarine. The restrictions imposed on the latter are set out in the second chapter; and the third is devoted to the relationship between the two commodities. The question of further taxation of oleomargarine is discussed in the remaining chapter, which includes the programme of the National Co-operative Milk Producers' Federation and accounts of the present taxes on butter and oleomargarine and the effects of the proposed five-cent tax. The book contains a bibliography and an index.]

Pittsburgh, University of. Bureau of Business Research Statistical Handbooks No. 3. Real Property Inventory of Allegheny County. Pittsburgh, Pennsylvania, 1937. 11″ × 8½″. x + 311 pp. $5.

[The United States Department of Commerce in 1933–34 conducted two surveys, the Real Property Inventory and the Financial Survey of Urban Housing, in sixty-four cities, to satisfy a growing demand among real estate dealers, financial institutions, and others vitally interested, for more information concerning housing This volume, consisting of 253 pages of tables, 31 maps, and 10 pages of explanatory text, contains a summary of the data dealing with housing and related subjects thus collected (under state sponsorship) by the Allegheny County Real Property Inventory The data include descriptions of the type, construction, condition, and age of the houses, their heating, lighting, cooking, bathing, and toilet facilities, also such particulars of the occupants as period of occupancy, tenure, race, persons in family and per room, and mode of transportation to work. There is also some information concerning non residential premises]

STATISTICAL NOTES.

1. BRITISH OFFICIAL STATISTICS.

ON page 465 we give our usual table summarizing the oversea trade of the United Kingdom for the years ended June 1936 and 1937. For the year 1936 imports exceeded exports of merchandise by £348 million. In the twelve months ended June this was increased to £377 million, there being an all-round expansion in imports, exports and re-exports. In 1935 there was a decline in the adverse balance; subsequently it has risen as follows, each half-year being compared with a year earlier—1936, first half, £38·3 million; second half, £34·6 million; 1937, first half, £29·3 million. The rate of increase in the adverse balance therefore appears to be slowing down, and were it not for the greater rise in prices of the foodstuffs, raw materials and non-ferrous metals imported than in the manufactured goods comprising the bulk of the exports, there would have been an actual reduction in the adverse balance. The figures published in the Board of Trade Journal for July 29 show that, at 1935 average values, retained imports were valued at £379·3 million in the first half of this year and £360·0 million a year earlier, showing a rise of £19·3 million, the corresponding figures for exports of United Kingdom goods being £234·4 million and £205·5 million—a rise of £28·9 million. The volume of exports in the first half of this year was 14 per cent. higher than a year earlier, whereas retained imports rose by only 5 per cent. The quarterly figures for exports have been: 1936, − ½, − 1, + 4½ and + 3½; 1937, + 10 and + 18½ per cent., the corresponding figures for retained imports being: 1936, + 8½, + 7, + 9 and + 5; 1937, + 3 and + 7½ per cent.

Total imports during the second quarter of the year were valued at £253·9 million, as compared with £202·5 million in the second quarter of 1936. Re-exports increased from £16·5 million to £21·8 million, there being, as for the first quarter, a marked increase in the value of wool, hides and skins, and non-ferrous metals re-exported. The increase in each of these, varying between £1·7 million and £2·1 million for the six months, was due mainly (in the case of wool entirely) to price changes.

The value of retained imports of food, drink and tobacco in the first half of this year amounted to £192,891,000, being £19,298,000 more than a year earlier. The increase in the second quarter was slightly greater than in the first. Nearly two-thirds of the increase was in respect of grain and flour, the value increasing from

£30,037,000 to £42,213,000, wholly as a result of higher prices. An outstanding increase was recorded for wheat, the value of the retained imports rising by £7,160,000 (42 per cent.), while the quantity fell from 49·7 to 47·2 million cwts., or by 5 per cent. Changes in quantities for the other principal cereals were also mostly small. Imports of beef, mutton and lamb, and bacon were all slightly higher, and for the first half-year there was no substantial change in average values. Imports of sugar, butter, cheese and eggs were about the same as a year earlier, but average values of all except eggs tended to be higher than in the first half of last year, the rise for sugar being substantial. There was a considerable decline in imports of tea. The only food group to show a decline in value compared with the first half of 1936 was fresh fruit and vegetables, due mainly to smaller imports of apples. Retained imports of tobacco also declined, in both quantity and value.

Retained imports of raw materials rose by £27,569,000 to £129,561,000, increases being recorded for each group except silk and coal. In the second quarter of the year, for the first time since the first quarter of 1936, imports of rubber exceeded re-exports. There was a considerable reduction in retained imports of wool in both the first and second quarters, accompanied by a very marked rise in average values. Retained imports of raw cotton were 84 million lbs. higher than in the first half of last year, imports exceeding those in any half-year since 1927. The increase was wholly in the first quarter. Prices were considerably higher than a year ago. Among commodities showing a considerable expansion in imports in both the first and the second quarters may be mentioned iron ore, wood and timber, ground nuts and unrefined coconut oil, imports of iron ore in the half-year being the highest for any comparable period since the first half of 1920.

An increase from £92,306,000 to £117,980,000 was recorded in retained imports of articles wholly or mainly manufactured, the increase being considerably larger for the second than for the first quarter. Imports in each group were higher than in the first half of 1936. Non-ferrous metals were responsible for nearly 40 per cent. and the manufactured oils group for nearly 20 per cent. of the rise in value. In the latter group, retained imports of refined petroleum were the highest yet recorded during any half-year; the increase was mainly in motor spirit. Much the most important increase in non-ferrous metals was that for copper, though there was some increase in the quantity of most of the non-ferrous metals imported. The principal cause of the high value of the imports was the marked general rise in average values. Imports of iron and steel were less than in 1936, but the value rose. The quantity of machinery imported increased by over 50 per cent. to 72,800 tons, a total exceeding that for any previous half-year. A large part of the increase was in machine tools, which formed nearly one-quarter of the total imports. Imports of motor cars rose by 50 per cent., but the total differed little from that in the first half of 1935.

Exports of United Kingdom goods were valued at £251,214,000 in the first half of this year, being £43,324,000 more than a year earlier. Taking the months in pairs to eliminate the effects of the changing dates of the Easter and Whitsun holidays, the increases this year over last have shown a continuous expansion, the figures being: January and February, £8·1 million; March and April, £16·6 million; May and June, £18·6 million. The increase was practically general, there being only three groups in the three main classes for which a smaller value was recorded, and no decrease exceeded £50,000. The rise of £810,000 in the first and £1,375,000 in the second quarter for food, drink and tobacco was attributable in the main to larger exports of spirits, chiefly to the United States. Exports of raw materials showed the largest proportionate increase, 32 per cent., exports of coal rising by £3,017,000 (22 per cent.) and of raw wool, etc. by £2,147,000 (63 per cent.), rises in price contributing to the latter increase more than to the former. The quantity of coal exported rose from 16·3 to 18·6 million tons, partly due to the resumption of substantial exports to Italy, increases of 297,000 and 413,000 tons being recorded in the first and second quarters. The rise in exports to France was more substantial—551,000 tons and 500,000 tons respectively—and there was also a marked increase in exports to Belgium. Bunker shipments of coal, after declining for a number of years, were very slightly greater than last year. Exports of manufactured goods increased from £161,913,000 to £195,031,000. The groups mainly contributing to this increase of over 20 per cent. were: iron and steel £6,118,000, cotton yarns and manufactures £4,730,000, vehicles £3,529,000, and machinery £3,053,000. For woollen and worsted yarns and manufactures, chemicals, drugs, etc., and miscellaneous manufactures increases in excess of £2 million were recorded.

The increase in exports of iron and steel goods this year has been very considerable; for the first quarter there was an increase of 151,000 tons (30 per cent.) and for the second quarter one of 148,000 tons (27 per cent.). The increase in exports was widespread, being particularly marked in respect of tinned plates, black sheets, wrought tubes and pig iron. There was a small decline in exports of railway material. The increase for machinery was not so large—21,000 tons (11 per cent.) for the six months—but there was a welcome increase in the second quarter in exports of textile machinery, which had been declining for a number of years. The expansion in exports of motor cars and pedal cycles continued, the numbers of motor cars and chassis and of cycles exported in the first half of this year exceeding those during the corresponding period of any earlier year.

Exports of textiles in general were larger than in the first half of any year since 1929, cotton piece-goods being an important exception, and wool tops and woollen and worsted yarns being exported in somewhat smaller quantity than in the first half of last year. Exports of cotton piece-goods were 55 million square yards (6 per cent.) higher than a year earlier, but slightly less than in the first half of 1935. Exports to India continued to decline, but there was a marked expansion in exports to the Dutch East Indies, Australia and Switzerland. The following increases were recorded in comparison with the first half of 1936: cotton yarns 11 per cent., woollen and worsted tissues 8 per cent., wool carpets 11 per cent., artificial silk piece-goods 34 per cent., linen piece-goods 6 per cent. and jute piece-goods 28 per cent. Exports of linen piece-goods were the highest since 1925. There was a very general expansion in exports of other manufactured goods, outstanding increases being recorded for plate and sheet glass, brass and manufactures, ammonium sulphate, sodium compounds and undressed leather. Tin was an important exception.

Movements of bullion and specie continued to be very active, and in each month except January and May imports exceeded exports. Imports during the six months amounted to £172·2 million and exports to £141·6 million, the import excess of £30·6 million comparing with £67·5 million in the first half of last year and £159·2 million in the second half.

The United Kingdom trade statistics for the year 1935, which have already been published in their usual form in the Annual Statement of Trade, appeared in a new form in a special supplement to the Board of Trade Journal, published on the 27th May.

The figures have been re-grouped in accordance with a new classification—the "Minimum List of Commodities for International Trade Statistics"—devised by the League of Nations for the purpose of facilitating comparisons between the trade statistics of different countries. The supplement will contain a note explaining the circumstances which have led to the introduction of the "Minimum List."

Movements and Classes.	Twelve Months ended June 1936	Twelve Months ended June 1937.	Increase (+) or Decrease (−)
Imports, c.i.f.—	£'000	£'000.	£'000.
Food, drink and tobacco	368,128	402,566	(+) 34,438
Raw materials and articles mainly unmanufactured	228,933	280,883	(+) 51,950
Articles wholly or mainly manufactured	197,314	240,907	(+) 43,593
Other articles	4,914	5,382	(+) 468
Total Imports ...	799,289	929,738	(+)130,449
Exports, f.o b.—			
United Kingdom Produce and Manufactures—			
Food, drink and tobacco	33,576	37,772	(+) 4,196
Raw materials and articles mainly unmanufactured	50,771	59,097	(+) 8,326
Articles wholly or mainly manufactured	330,110	374,034	(+) 43,924
Other articles	12,793	13,139	(+) 346
Imported Merchandise—			
Food, drink and tobacco	11,973	12,218	(+) 245
Raw materials and articles mainly unmanufactured	30,474	38,105	(+) 7,631
Articles wholly or mainly manufactured	16,165	17,804	(+) 1,639
Other articles	253	435	(+) 182
Total Exports ...	486,115	552,604	(+) 66,489
Bullion and Specie—			
Imports	217,729	397,673	(+)179,944
Exports	158,346	207,815	(+) 49,469

Movements of Shipping in the Foreign Trade—	Number of Vessels.	Thousand Tons Net.	Number of Vessels	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.
Entered with cargoes—						
British	24,284	36,968	24,542	38,883	(+) 258	(+)1,915
Foreign	25,657	28,733	26,678	30,051	(+)1,021	(+)1,318
Total entered ...	49,941	65,701	51,220	68,934	(+)1,279	(+)3,233
Cleared with cargoes—						
British	29,096	34,052	30,168	35,130	(+)1,072	(+)1,078
Foreign	21,091	22,756	22,450	23,977	(+)1,359	(+)1,221
Total cleared ...	50,187	56,808	52,618	59,107	(+)2,431	(+)2,299

The generally steady increase in *wholesale prices* in 1936 continued through practically the whole of the first six months of 1937, apart from the abnormal fluctuations in the prices of non-ferrous metals and small declines in textiles during May and June. The Board of Trade Index Number of general wholesale prices (1930 = 100) which had advanced rather more than 10 per cent. during 1936 (91·5 to 100·8) moved upward nearly another 10 per cent. during the six months January to June 1937 when the index number stood at 110·6. During the period of depression (1930–34) the index number fell as low as 82·7 in March 1933, and prices are now over 33 per cent. in advance of those current at that date. Looking back three years (to June 1934, when some improvement was beginning to be apparent), it will be seen how considerable has been the increase in prices in all the principal groups. Basic materials have advanced 46 per cent., intermediate products 26·4 per cent. and manufactured articles 20·5 per cent. Prices of basic materials have more than doubled since they were at their lowest point in May 1932. Food prices have increased 20·5 per cent. and industrial materials 28·4 per cent. The increases in the index numbers of some of the principal groups have been much more considerable. Cereals show an advance of 50·8 per cent., non-ferrous metals 41·5 per cent., wool 40·9 per cent., iron and steel 34·9 per cent. and coal 28·2 per cent. The index number for building materials has advanced only 13 per cent. since June 1934, but prices for these have never sagged to any great extent and at their lowest were only 8·8 per cent. below the average of 1930. The very high prices in March 1937 attained by some of the non-ferrous metals as a result of a speculative movement did not last over the month and prices have since fallen away to an appreciable extent but they are still considerably above the prices obtaining in June 1937.

The Board of Trade index numbers for the last six months are given below. (Averages for 1930 = 100).

Date	Total Food.	Total not Food.	All Articles.	Basic Materials.	Inter-mediate Products.	Manu-factured Articles.	Building Materials.
Jan., 1937	99·4	104·6	102·9	116·7	103·3	102·2	101·1
Feb. ,,	98·6	106·5	103·9	120·9	104·3	103·2	101·2
Mar. ,,	100·7	110·7	107·3	129·2	107·0	106·5	103·8
Apl. ,,	102·0	112·5	108·9	132·2	107·5	108·4	103·5
May ,,	101·7	115·4	110·7	131·6	110·9	113·6	104·0
June ,,	101·6	115·3	110·6	129·4	110·7	114·4	104·3
June, 1936	*89·3*	*94·3*	*92·6*	*95·9*	*91·5*	*98·1*	*96·1*
,, *1935*	*86·6*	*89·4*	*88·5*	*87·5*	*87·1*	*94·6*	*93·8*
,, *1934*	*81·3*	*89·8*	*87·9*	*88·4*	*87·6*	*94·9*	*92·3*

The figures for certain of the other British index numbers of wholesale prices and for those of Germany, France and the United States are given for comparison.

Date.	Board of Trade (1930 = 100)	*Economist* (1927 = 100).*	*Statist* (1866–77 = 100).*	*The Times.* (1913 = 100).*	France (*Stat. Generale*) (July 1914 = 100).	Germany (*Stat. Reichsamt*) (1913 = 100).	United States (Bureau of Labour) (1926 = 100).†
Jan., 1937	102·9	81·0	99·2	122·8	513	105·3	83·0
Feb. „	103·9	82·3	101·7	124·9	517	105·5	84·0
Mar. „	107·3	87·2	106·9	131·5	537	106·1	85·3
Apl. „	108·9	85·7	104·3	129·3	532	105·8	86·3
May „	110·7	86·2	105·7	132·1	529	—	86·3
June „	110·6	—	—	129·7	—	—	86·0

* Prices at end of month.
† Average of weekly figures.

The seasonal decline in retail food prices which usually takes place in the first half of the year has not been apparent in the first six months of 1937, and the Ministry of Labour's index number of retail prices of articles of working-class consumption has shown little change during the period. It remained at 151 (prices at July 1914 = 100) from January 1 to April 1, 1937, and rose to 152 at May 1, and was at the latter figure at June 1. The index number for food prices only has also remained practically stationary over the six months January to June, but the figure for June (136) shows a rise of nearly 8 per cent. over the figure (126) for June 1936 and of rather more than 19 per cent. over the figure (114) for June 1933. Over the same period (1933 to 1937) the June figure for wholesale prices of articles of food show an advance of over 22 per cent.

The index number for food prices was at June 1, 1937, higher than in any month since January 1931.

THE Ministry of Agriculture's general index number of the prices of agricultural produce in England and Wales (base 1911–13 = 100) during the first six months of the present year reached a substantially higher level than in the corresponding months of 1936, or indeed of any year since 1930. The figures are given below with those of 1930 for comparison :

	Jan.	Feb.	Mar.	April	May	June
1937	130	129	130	140	133	131
1936	119	118	116	123	115	116
1930	148	144	139	137	134	131

If allowance were made for payments under the Wheat Act, 1932, and the Cattle Industry Act, 1934, the figures for 1937 would be increased by about 3 points, and would thus in some months exceed the corresponding figures for 1930.

A change of some interest is being made in the publication of the Agricultural Statistics of England and Wales. Hitherto, the Statistics have been published in two parts, each consisting of a report with accompanying tables; in future, although the publication in two parts will be continued, it is proposed to alter the arrangement so that the main body of statistical tables will be concentrated in Part I, while Part II will contain an analysis of the tables in Part I with some particulars of the supplies of agricultural produce and requirements. It is proposed also to include the results of special enquiries made in connection with the Agricultural Census of Production. The object of the change is to expedite as far as possible the publication of the available statistics, many of which are, moreover, issued in summary form in advance of their inclusion in the annual volume.

Part I for 1936 (*H.M. Stationery Office, Price 1s. 6d. net*) under the new system has recently been published, and gives tables relating to crops and live stock, the output, value and prices of agricultural produce, numbers of workers and agricultural holdings, with short comments on the principal features. There are also a number of tables for series of years, and summaries covering Great Britain and the United Kingdom.

The estimated value of the gross output of agricultural and horticultural produce in England and Wales for 1935–36 as calculated by the Ministry of Agriculture (*Part I, Agricultural Statistics*, 1936) amounted to £208,165,000, as compared with £209,450,000 in the preceding year. These figures, in addition to all ordinary produce, include a provisional estimate for glasshouse produce.

In the aggregate, the change between the two year's was small, but there were a number of variations in individual items; the value of the output of pigs increased by £1,640,000 or 8 per cent., and of eggs by £1,060,000 or 7 per cent., but the total increase in live stock and live-stock products taken together was only £1,900,000 (1·3 per cent.). In the farm crops group as a whole there was little change, although the value of the output of potatoes rose by £2,200,000 or nearly 19 per cent. On the other hand, the value of sugar beet declined by £1,490,000 or over 20 per cent. It was a poor year for fruit, and the value of the output in 1935–36 was less than half that of the previous year. Vegetables, however, showed an increase.

The wheat and cattle subsidies form an addition to the above totals, and these amounted in 1935–36 to £7,960,000 as against £8,310,000 in the preceding year, so that the aggregate value of the output (including glasshouse produce) was £216,125,000, compared with £217,760,000 in 1934–35, a decrease of about 0·7 per cent. The lowest figure reached during the recent depression was £184,830,000 in 1932–33. In that year, the wheat subsidy amounted to £4,270,000, giving a total of £189,100,000, so that compared with that minimum year, the total for 1935–36 shows an increase of 14 per cent.

Apart from the usual seasonal decline in January employment continued to improve throughout the first six months of 1937, and the number on the registers of the employment offices in Great Britain at the end of June (1,356,598) was lower than at any time since December 16, 1929. Since the end of January there has been a decline of 332,625 and as compared with June 1936 a decline of 346,078. The average rate of unemployment in the insured trades in Great Britain and Northern Ireland at the end of June 1937 was 10·3 per cent., compared with 10·9 in May, 10·8 in April and 11·8 in March. It was lower than in any month since September 1929, when it was 9·9 per cent. As compared with June 1936 employment showed an improvement in all divisions, but was least in the North-Eastern area owing to suspensions of work in Yorkshire on June 21 on account of a miners' demonstration. The principal decreases in unemployment in June 1937 compared with June 1936 was in coal-mining, the number falling as much as 105,000. There were also decreases of 27,000 in the cotton industry, 25,000 in the distributive trades and 20,000 in engineering. Shipbuilding, iron and steel, and metal goods manufacture and public works construction also showed considerable reductions in the numbers unemployed.

The number of workpeople (insured and uninsured) on the registers of the employment exchanges in Great Britain are given below for the first six months of 1937.

Date.	Wholly Unemployed.	Temporarily Stopped.	Persons normally in Casual Employment.	Total.
Jan. 25, 1937 ...	1,433,957	183,668	71,598	1,689,223
Feb. 22 ,, ...	1,391,932	161,834	74,079	1,627,845
Mar. 15 ,, ...	1,359,556	167,677	73,968	1,601.201
Apl. 19 ,, ...	1,254,646	128,655	71,142	1,454,443
May 24 ,, ...	1,173,802	207,228	70,300	1,451,330
June 21 ,, ...	1,088,866	199,800	67,932	1,356,598
June 22, 1936 ...	*1,326,057*	*301,793*	*74,826*	*1,702,676*

The above figures include juveniles aged 14 and 15 and agricultural workers who became insurable on May 6, 1936.

The Ministry of Labour has continued to publish in the *Labour Gazette* the results of its enquiry as to the *earnings and hours of labour* of workpeople employed in the principal manufacturing and non-manufacturing industries at October 1935. A summary of the information relating to seven large industrial groups covering about a hundred trades, or branches of trade, was given in Part II of the *Journal*, and below are given from the April and May issues of the *Labour Gazette* figures relating to a further eight groups of industries and services covering between 90 and 100 separate trades, etc.

Industrial Group.	Nos. of Workpeople Covered by Returns.	Average Weekly Earnings of										Average hours Worked by all Workpeople.
		Men (21 years and over)		Youths and Boys (under 21 years).		Women (18 years and over).		Girls (under 18 years).		All Workpeople Covered by Returns.		
		s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	
Metal Industries	1,478,212	67	7	22	3	31	1	17	3	53	2	48·2
Engineering * ...	*760,287*	*68*	*10*	*22*	*0*	*32*	*7*	*17*	*9*	*54*	*7*	*48·6*
Wood working Industries ...	191,979	65	1	21	11	33	10	15	7	51	2	48·3
Other Manufacturing Industries ...	138,065	64	11	25	1	30	1	16	3	43	11	48·2
Building ...	387,985	61	2	21	9	30	2	16	6	56	11	46·9
Mining and Quarrying (other than Coal) ...	65,981	53	4	26	6	29	7	17	11	50	6	45·7
Transport and Storage ...	231,622	69	1	25	3	32	4	16	7	65	6	48·6
Public Utility Services ...	450,835	57	10	25	8	28	2	15	5	55	6	48·0
Government Industrial Establishments ...	101,676	69	9	29	11	38	10	19	3	66	2	49·7

* Included in figures for Metal trades.

Including figures for those trades published in Part II of the *Journal* the total number of workpeople included in this earnings enquiry amounts to over five and a half millions in about 200 different trades and a large sample of the industrial population. Apparently no figures are available in exactly the same form for persons employed in coal-mining.

The Ministry of Transport Return of Railway Statistics No. 208 gives particulars of passenger traffic carried during the month of March 1937, freight traffic and operating results for the four weeks ended March 20th, with aggregates from the commencement of the year. Comparison of the passenger figures with 1936 is affected by the incidence of the Easter holiday, but substantial increases in the number of passengers and the receipts therefrom during the first quarter of the year reflect a continuance of the general upward trend of the past three years. Passenger journeys to March 31 were 300,707,000 (exclusive of season tickets), an increase of 1·6 per cent., the receipts being 10·5 per cent. higher at £10,685,000. If the figures relating to the railway undertakings of the London Passenger Transport Board are excluded, the number of journeys was 196,526,000, an increase of 2·4 per cent. and the receipts improved by 12·0 per cent. to £9,302,000. Excursion and "monthly return" fares provided 63 per cent. of the passenger revenue of the main-line companies and the receipts per journey over those systems rose from 10·38*d.* to 11·36*d.* Season tickets produced £2,564,400, an advance of 1·5 per cent. Freight tonnage for the twelve weeks ended March 20 continued to improve, being 2·1 per cent. higher at 69,872,000 tons, whilst ton-mileage increased by 2·6 per cent., the average distance hauled having risen by 0·25 mile to 57·98. The average receipts per ton were slightly higher at 6*s.* 5*d.*

Heavier working during this period is reflected by the operating statistics, coaching-engine mileage having increased by 1·2 per cent. to 75,066,000, and freight-engine mileage by 2·0 per cent. to 62,105,000. There was practically no improvement in coaching-train miles per hour at 15·10, but a slight increase brought the freight figure to 8·42. These averages are based on train-hours which comprise the whole of the time the engine is available for train work, including standing at stations, signals, etc., but apart from some spectacular individual performances, railway speeds as a whole show little tendency to improve. There is an apparent paradox in the average wagon-load figures, each of the three classes of traffic (Merchandise, Mineral and Coal) showing an increase, whilst the total, at 5·70 tons, is slightly lower. This is due to the relatively large expansion (5·5 per cent.) in the general merchandise tonnage with a low average load as compared with a small improvement in the heavy loading coal traffic of 1·1 per cent. The average freight train load, at 131 tons, is slightly below the 1936 figure, but ton-mileage per engine-hour increased by 0·9 per cent. to 454·25.

A preliminary return issued by the Ministry of Transport shows the principal results for the year 1936. The total railway receipts of the main-line companies improved by nearly 4·0 per cent. to £164,000,000 whilst expenditure advanced by only 2·5 per cent. to £130,600,000. Net receipts from railway working rose from £30,300,000 to £33,400,000. Other businesses carried on by the companies added a further £3,100,000, thus giving a total net revenue of £36,500,000, as compared with £33,695,000 in 1935. The average rate of interest paid per cent. of capital receipts rose from 3·08 to 3·26.

The companies' returns of gross traffic receipts for the 25 weeks to June 27, are as follows :—

	Receipts.	Increase on 1936.	
	£	£	%
Great Western	12,504,000	650,000	5·5
L.M.S.	30,348,000	1,264,000	4·3
L.N.E.	22,247,000	1,075,000	5·1
Southern	9,664,000	339,000	3·6
Total	£74,763,000	£3,328,000	4·7
London Transport (52 weeks) .	£28,732,000	£255,100	0·9

The Colonial Office has issued a foolscap volume of vi + 593 pages (price 25s.—H.M. Stationery Office, 1937) called *An Economic Survey of the Colonial Empire* (1935), which is described as " an attempt to assemble within a single volume all the essential facts relating to the economic situation of the Colonial Empire," *i.e.* the non-self-governing colonies and their dependencies, the protectorates, the protected Malay and Bornean States, and the mandated territories administered by the British Government. The first part deals separately with each territory, treating first of its geography and demography, and then summarizing the financial position (generally on the basis of the estimates for 1936), including currency and banking. The fourth section gives the trade statistics, showing (where available) the total value of imports and of exports in 1913, 1932, 1933, 1934, and 1935 and an analysis of the trade for 1935 according to classes of goods and countries of origin and destination. Then follows " an account of the natural resources of the Dependency " (*i.e.* each territory) " divided into six heads : (1) Agriculture, (2) Forestry, (3) Animal Husbandry, (4) Minerals, (5) Fisheries, (6) Miscellaneous, and an estimate of the extent to which the Dependency is self-supporting in foodstuffs. The rest of the first part treats of industrial activities, other economic activities, transport, tariffs, and trade representatives. The second part contains " a series of memoranda on the products of the Colonial Empire, both those which are produced for export and those which are produced only for internal consumption"; these are: animals and animal products, cereals other than rice, cocoa, coffee, cotton, essential oils, fibres other than cotton, fruit and nuts, gums and resins, marine products, minerals, oilseeds and nuts and vegetable oils, rice, rubber, spices and condiments, sugar and sugar products, tea, timber, tobacco, vegetables and tubers, miscellaneous products. This part covers 113 pages, of which 37 are tables. Figures of production are given where possible together with particulars of exports for 1932–35. This volume should prove very useful not only for students of colonial administration, but also for traders and manufacturers.

2. OTHER STATISTICS.

The considerable decline in the value of *Stock Exchange Securities* noted in the last issue of the *Journal* continued generally during the three months March to May 1937, and the index number of prices of securities prepared by the *Bankers' Magazine* showed a further fall of 1·5 per cent. The fall was most marked in the case of the variable interest securities amounting to 4·3 per cent. The fall in Fixed Interest Stocks was less noticeable, but there has been a fairly continued decline in these since October 1936 of nearly 6 per cent. The general index number (December 1921 = 100) stood at 127·8 at May 19, 1937, which was lower than at any time since December 1935. British Railway Stocks of all kinds have of late showed some improvement, but the general political situation, and the financial position in France militate against any general appreciation in the value of securities.

The marked increase in *shipping freights* continues and prices in May 1937 had advanced 10·7 per cent. since February and over 74 per cent. compared with May 1936. There has been a large amount of time-chartering with rates considerably more than double those prevailing in May 1936. Among voyages subject to minimum scales of freight advances were on the whole well maintained. The index number (1920 = 100) of the Chamber of Shipping rose from 32·56 in February 1937 to 32·90 in March, 34·41 in April and 36·05 in May. As compared with the average freights in 1929, prices in May 1937 showed an advance of nearly 45 per cent., and there seems little likelihood of the Government being called upon to disburse any portion of the £2,000,000 provisionally allotted for a subsidy to tramp shipping in respect of the year 1937, which can only mature if the average rate is lower than in 1929.

Over the four months February to May 1937 the statistics of *retail sales* prepared by the Bank of England in conjunction with various retail distributors' associations show an increase of 9·2 per cent. over the sales in the corresponding four months of 1936. Sales of food and perishables increased 10·8 per cent. and other merchandise 7·5 per cent. The average daily sales for each of the four months (average of 1933 = 100) were 110, 124, 119 and 134 compared with 102, 108, 117 and 118 in February, March, April and May 1936 respectively.

The *International Year Book of Agricultural Statistics* for 1935–36 and 1936–37, issued by the International Institute of Agriculture, is arranged in the same way as preceding editions, but an endeavour has been made to bring it more up-to-date than formerly, although in some cases the latest available figures are necessarily provisional and liable to subsequent amendment.

A valuable part of this publication is the section giving a view of the agriculture of each country so far as it can be seen in figures such as the area and production of crops, number of live stock, etc. Another section reverses this information, and shows the distribution of the total world production by bringing together particulars for each country under headings such as, cotton, wheat, cattle, etc. In the same way, the world trade in all the important agricultural products is given showing imports, exports and balance of trade for each country. These main tables are supplemented by particulars as to prices, freights, rates of exchange, production and trade in fertilizers, and distribution of agricultural holdings.

The information given is exhaustive, but this publication now extends to over 1,000 pages, and it is a question whether it could not be reduced in size with advantage. The practice of giving figures for series of years, though praiseworthy in itself, seems in some cases to be carried to excess. This is particularly noticeable in the tables relating to prices, where monthly and frequently weekly prices are given for five or six years. Students and others who desire information in this detail might reasonably be expected to consult previous issues.

The Institut für Konjunkturforschung, of which our Honorary Fellow, Professor Ernest Wagemann, is editor, has published a report (No. 44) on *Energiequellen der Welt, Betrachtungen und Statistiken zur Energiewirtschaft*, by Dr. R. Regul and K. G. Mahnke (1937, Berlin, Hanseatische Verlagsanstalt, Hamburg, 78 pp. 11¾″ × 8½″, price 7·80 M.). Sources of energy are coal, oil, water-power, and wood. The age of coal is first described, next the growth of the use of oil, and then the modern substitution of water-power in countries poor in coal. From 1913 to 1929 the world consumption of energy rose by a quarter and then fell off till 1932, recovering in 1935 to over 15 per cent. above 1913. In 1913 hard coal accounted for 71·4 per cent., oil for 4·5 per cent., and water-power for 2·4 per cent., in 1935 the respective percentages were 56·6, 16·5, and 6·6. The different methods of utilizing energy and their geographical distribution are then discussed, and also the international trade in coal and oil. There follow 38 pages of tables giving the present resources of different countries in coal, petroleum, water-power, and wood; the annual production by countries of coal and petroleum since 1860, their estimated annual wood-cut, the production of natural gas, coke, benzol, briquettes, gas and gas-coke, since 1925, the production of electricity since 1920, and the production of benzine, gas-oil, fuel oil, and kerosene since 1925; and, lastly, international trade since 1925 in the foregoing products. A bibliography concludes a very useful report.

CURRENT NOTES.

THE appearance of a sixth edition of Professor R. A. Fisher's *Statistical Methods for Research Workers* shows that there is no slackening in the demand for a volume which has now become classical.

Additions to the fifth edition were sections dealing with Yates's correction for continuity and an exact test of significance for 2 × 2 tables, a further section dealing with the adjustments necessary in handling regression equations when, at a late stage, it is decided that one or more of the variates used may with advantage be omitted, and a historical note on the principal contributors to the development of statistical reasoning.

The sixth edition gives a new test of homogeneity for data with hierarchical subdivisions illustrated by some genetical data. It is an extension of the principle of splitting χ^2 up into components. Working and Hotelling's formula for the sampling error of values estimated by regression is given, and attention is drawn to an extended use of successive summation in fitting polynomials.

Finally a table of the (0·1) per cent. points of the z distribution is given which should be especially useful "when the test we make is the most favourable out of a number which *a priori* might equally well have been chosen."

The question of a special liability of omnibus workers to gastric illness, which occupied such an important place in the recent dispute between the omnibus men and the London Passenger Transport Board, has been answered, as conclusively as such questions can be answered, in a Report by Dr. Bradford Hill issued by the Industrial Health Research Board (No. 79, "An Investigation into the Sickness Experience of London Transport Workers with special reference to Digestive Disturbance." H.M. Stationery Office. 1937. 6*d.*). The investigation covered the period 1933–35, and the results showed that at all ages the proportion of gastric illness to all illness was 12–14 per cent. greater among London omnibus drivers than among London tramway drivers, and 15–18 per cent. greater among the omnibus conductors than among the tramway conductors; or, stated in another way, that one day in 6½ of the total days of sickness of the omnibus workers was attributed to gastric causes, while if their experience had corresponded with that of the tramway workers, the rate would have been one day in 7½. The relative excess of the omnibus drivers was confined to the ages 30–49 and that of the conductors mainly between the ages 20 and 39; it is noted, however, that these age-groups contain respectively about three-quarters of the total number of drivers and about two-thirds of the total number of conductors. Similar conclusions were obtained by comparing absolute figures of sickness from all causes and sickness from gastric causes of omnibus workers as compared with tramway workers.

The conclusions, with summary comment, occupy just over two pages of the report. The other 22½ pages of text show how the results were arrived at. In the first place, the Industrial Health Research Board set up a special Committee, including representatives of both sides of the industry, to determine the best method of enquiry, and their findings are set out and explained. The experience of the tramway workers was judged, for reasons shown, to offer the most appropriate standard of comparison; the sickness data, relating in all to a million and a quarter days of sickness, were provided by the records of the London Passenger Transport Board. The working of the problem, which occupied about three years, is shown, and the statistical results are given in tables showing the rates of gastric to all sickness in the four sets of workers, according to age-groups, and also the observed number of days and periods of gastric sickness among omnibus men in relation to the "expected" number on the basis of the tramway men's experience. Apart from the utility of the actual results obtained, the report is most valuable both in showing the difficulties encountered in determining a question of this kind and in providing those who may have to attack similar problems with an example of the way in which they should be handled.

The Population Investigation Committee was formed, under the chairmanship of Professor Carr-Saunders, to examine the factors influencing contemporary trends of population in England and Wales with special reference to the fall of the birth-rate. It has issued an excellent little pamphlet, entitled *The Future of Our Population*, prepared by Dr. C. P. Blacker and Mr. D. V. Glass (price sixpence, obtainable from the Secretary, 69 Eccleston Square, S.W.1.). In this, the authors shortly trace the history of our population in the last 150 years showing that its increase has been caused not so much by a rise in the birth-rate as by a fall in the death-rate. They then turn to the fall in the birth-rate during the last half-century, and discuss its effects upon the age composition of the population and the inevitable decline that our numbers must undergo (apart, of course, from immigration) with a net reproduction rate substantially below unity. After one or two tentative estimates of its course in the future, they devote themselves to the very difficult question as to *why* people are having fewer children. They group the causes under three headings :—namely, medical, social and economic, and psychological—but are forced to conclude that they can do little more than enumerate some of the possible factors which are thought to influence people in restricting their families. Into these questions the Committee, given sufficient funds, hopes to make further statistical investigations and direct enquiries. Their present pamphlet is an effective and very clear statement of the problem.

Readers of this *Journal* who in the course of their work have occasion to make use of banking and monetary statistics will be interested to know of the recent International Conference of Commercial Bank Economics, arranged and presided over by Mr. W. F. Crick, of the Midland Bank. This was a conference of fifteen economists in the service of commercial banks operating in a wide variety of countries—the United States, Canada, Australia and New Zealand; England, France, Germany, Italy, Switzerland, Holland, Denmark and Sweden. Discussion was concerned mainly with the theory and technique of banking policy and operations, regarding the banking system as a section of the general economic organism. Matters of Government direction and supervision, central bank control and commercial banking technique thus occupied a large place in the deliberations, special consideration being given to such vital topics as the long-term trends in the composition of bank assets, the relative elasticity of interest rates, the relations of the banks with the capital market, and so forth.

Questions concerning statistical equipment were encountered at various points in the discussions, and comparisons were made of the validity, for specific purposes, of the statistics made available in published form from country to country. The members of the conference determined upon an effort in joint research, along selected lines of enquiry, into the application of available monetary statistics to the study of business fluctuations. Having regard to their specially favourable position for observations of these matters, it is hoped that it may thus be possible to make some definite contribution to a fuller and more realistic comprehension of the relations between monetary affairs and business conditions.

The Incorporated Society of British Advertisers is an association of British business firms who have combined " to safeguard and promote the interests of the buyers of advertising." Considering it desirable that, as enormous sums were invested yearly by business firms in newspaper advertising, a "particularly careful scrutiny" should be made of the choice of media offered, a committee was set up which approached the Royal Statistical Society and on their advice secured the services of Dr. J. Neyman as an expert in statistical sampling. The problem was, given the net sales of a newspaper, to estimate the proportion of readers "whose financial circumstances and spending power place them within the category of prospective purchasers." The co-operation of the newspaper proprietors was secured, and an attempt was made to ascertain the reading habits of 80,000 families, distributed over 1232 towns and villages, and then calls were made on dwelling-houses so as to secure an interview with one family in 116. Lastly, an estimate was madè of the social status of the families visited (in five classes), based chiefly on occupation of the head of the family and rental value of the house, and it was recognized that this part of the work could at best only give approximate results. The Incorporated Society conducted their enquiry through Sales Research Services and have now published a report, *The Readership of Newspapers and Periodicals of Great Britain* in xx + 387 quarto pages. Opening at page 50, we find particulars of nine morning newspapers circulating in Leicestershire, and for the first of these 3·10 per cent. of the circulation was among families below £125 income, 13·82 per cent. among families with £125–249, 73·86 per cent. among families with £250–499, and 9·22 per cent. among families with £500 and over. This example is repeated, with some variation of classes, for all the towns and villages visited. As nothing was known before with certainty, these results, if used with sufficient caution, will be of use to advertisers. They are also of considerable sociological interest.

The Bank of England have been good enough to present to the Society a copy of the *Bank of England Reference Library Catalogue*, in which are listed "the books, pamphlets, periodical publications, and other documents in the Directors' and Reference Libraries." It is added that the references to legislation include only those statutes and regulations which are on the shelves of those libraries; in addition, the Bank possesses "an up-to-date collection of copies of all such legislation as might be looked for under the headings relating to the several classes of banks, banking law, agricultural credit, currency, and kindred references." Some of the more important reference books (*e.g.*, the *Encyclopædia Britannica*) are also excluded since they are in the "Clerks' Library." "The List of Subjects Headings and Principal Sub-Divisions" runs to about 680 items. In all 387 quarto pages are devoted to books and 111 to periodicals. The early directors do not appear to have shown much interest in the writings of those who in the eighteenth century sought to teach them their business. The first item under "Banks and Banking" is the fifth edition of S. Thomas's *The Banker's Sure Guide* (1782), and then there is a gap till 1838, after which the 19th century provided 27 entries. "Economics" includes 42 entries, the earliest being Sir James Steuart's *Enquiry into the Principles of Political Economy*; only the fifth edition of Adam Smith's *Wealth of Nations* is listed. On the other hand, four seventeenth-century tracts on Commerce are included, and it is fair to say that the apparatus of recent literature on all subjects in which the Bank might be interested is reasonably abundant. The compilation reflects great credit on the Librarians, Mr. Cotton and Miss Little.

The Society has also received *Festschrift zur Hundertjahrfeier des Vereins fur Geographie und Statistik zu Frankfurt am Main*, a foolscap volume of xii — 438 pages. This Society, which celebrated its centenary in 1936, is the fourth oldest geographical society in the world, being antedated only by those of Paris, Berlin, and London. The volume contains 13 articles by different authors, chiefly of a geographical and demographic character, and is abundantly illustrated with views and sketch-maps and with a portfolio of larger maps. The editors of the *Journal* offer their congratulations to the Frankfurt Society on the completion of their first century, and tender their best wishes for a long-continued career of honourable usefulness.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

The Banker—

May, 1937—Bank reserves : *Prof. Irving Fisher*. Hire-purchase finance and machine control : *C. Ralph Curtis*. Standstill bills : *Paul Einzig*. The future of the sterling bloc : *W. W. Syrett*.

June, 1937—Germany's opportunity? *a correspondent*. Gold and "hot money" : *Paul Einzig*. The economics of traders' payments : *a correspondent*. "100 per cent money" : *A. V. Barber*.

July, 1937—France : economic and financial condition. [Whole number.]

Bankers' Magazine, June, 1937—Money and credit : *John Brunton*. The measure of elasticity : *H. C. F. Holgate*.

Economica, May, 1937—Changes in the price level under the influence of maladjustments of supply and demand : *W. Zawadzki*. Some technical aspects of the finance of rearmament : *N. F. Hall*. Industrial fluctuations : *R. Arakie*. An analysis of unemployment, III : *Sir William Beveridge*.

Eugenics Review, April. 1937—Economic consequences of a declining population : *J. M. Keynes*. The heredity of the Royal caste : *W. T. J. Gun*. The population problem and the future : *D. V. Glass*.

Faculty of Actuaries, Transactions, Part III, 1937—The mortality experience of Scotland in the years 1930–1932 : *J. G. Kyd* and *P. G. Brown*.

Institute of Bankers, Journal, May, 1937—Current comments on gold and the exchanges : *H. E. Evitt*.

Lloyds Bank Ltd., Monthly Review—

May, 1937—How to mitigate the next slump : *Lionel Robbins*.

June, 1937—The trade cycle and the budget outlook : *H. D. Henderson*.

Midland Bank Monthly Review, May–June, 1937—Cash reserve ratios as a factor in monetary policy.

Public Administration, July, 1937—The value of economic training for public administration : *Professor Arnold Plant*.

Royal Agricultural Society of England, Journal, Vol. 97, 1936—Housing the agricultural worker : *R. T. Shears*. Labour, power and equipment in arable farming : *R. McG. Carslaw* and *C. Culpin*. The technique of modern field experiments : *E. M. Crowther*.

UNITED KINGDOM—*Contd.*

Royal Society of Arts, Journal—

May 7, 1937—The present position and prospects of the coal industry: *J. P. Dickie.*

May 14, 1937—The displacement of labour by machinery: *H. D. Henderson.*

June 4, 1937—Agricultural indebtedness in the United Provinces: *Sir Edward Blunt.*

June 18, 1937—Housing and planning—English and American compared: *Sir Raymond Unwin.*

Sociological Review, April, 1937—Means tests and responsibility for needy relatives: *P. Ford.* The migration of British citizens between the United Kingdom and Europe: *R. S. Walshaw.*

Westminster Bank Review—

May, 1937—Restriction schemes in recovery.

June, 1937—Trends in taxation.

INDIA—

Indian Journal of Economics, April, 1937—Papers read and discussed at the twentieth conference of the Indian Economic Association held at Agra, January 1937. [Whole number.]

Sankhyā, Indian Journal of Statistics, Part I, 1937—Normalisation of variates and the use of rectangular co-ordinates in the theory of sampling distributions: *P. C. Mahalanobis, R. C. Bose*, and *S. Roy.* The future trend of population growth in India: *B. P. Adarkar.* The need of a sample survey of the growth of population in India: *P. C. Mahalanobis.* Correlation of weather conditions and yield of *Kumpta* cotton, Dharwar District: *S. Ramakrishnan.* Frequency distribution of length and weight in normal newborn infants: *Borghlid Gunstad.*

UNION OF SOUTH AFRICA—

South African Journal of Economics, March, 1937—Notes on the Union's imports, exports and overseas balances: *A. J. Limebeer.* The balance of trade between South Africa and Australia: *Professor A. G. B. Fisher.* Gold-mining investment: *W. J. Busschau.*

UNITED STATES—

American Economic Review, June, 1937—A break in Keynes's theory of interest: *Carl Landauer.* American devaluation: prices and export trade: *N. L. Silverstein.* Unemployed: income and expenditure: *E. W. Gilboy.*

Annals of Mathematical Statistics, March, 1937—Applications of two osculatory formulas: *J. L. Roberts.* Some simple developments in the use of the coefficient of stability: *C. H. Forsyth.* Internal and external means arising from the scaling of frequency functions: *E. L. Dodd.* Moments of any rational integral isobaric sample moment function: *P. S. Dwyer.*

UNITED STATES—*Contd.*

Econometrica, April, 1937—The summation of random causes as the source of cyclic processes : *E. Slutzky.* Mr. Keynes and the "Classics" : a suggested interpretation : *J. R. Hicks.* Monopoly over time : *Gerhard Tintner.* The sensitivity of taxes to fluctuations of trade : *R. F. Bretherton.*

Harvard Business Review, No. 3, 1937—Social security in France : *W. A. Sollohub.* The farmers' banking system : four years of FCA operations : *J. K. Galbraith.* Quantitative market analysis methods : *Lyndon O. Brown.*

Journal of Political Economy, April, 1937—Some notes on duopoly and spatial competition : *A. P. Lerner* and *H. W. Singer.* The new industrialism in Latin America : *George Wythe.*

Milbank Memorial Fund Quarterly, April, 1937—Significance of population trends to American agriculture : *O. E. Baker.* Frequency of immunizing and related procedures in nine thousand surveyed families in eighteen States : *S. D. Collins.* Health indices : *K. Stouman* and *I. S. Falk.*

Quarterly Journal of Economics, May, 1937—The growth of farm tenancy in the United States : *J. D. Black* and *R. H. Allen.* Excess capacity and monpolistic competition : *J. M. Cassels.* Some aspects of the pure theory of capital : *Professor A. Samuelson.* The old-age reserve account—a problem in government finance.

Review of Economic Statistics, May, 1937—Failure and fulfilment of expectations in business fluctuations : *A. G. Hart.* The notion of "economic system" underlying business-cycle analysis : *K. Pribram.*

Social Research, May, 1937—The volume of money and the business cycle : *W. Lederer.*

Wheat Studies of the Food Research Institute—

March, 1937—World wheat acreage, yields, and climates.

April, 1937—Soviet agricultural reorganization and the bread-grain situation.

May, 1937—World wheat survey and outlook May 1937.

BELGIUM—

Bulletin de l'Institut des Sciences Economiques, Mai, 1937—Analyse de la répartition du chômage complet d'après l'enquête speciale de mars 1936 : *Charles Roger.*

Revue du Travail—

Avril, 1937—Enquête organisée par le service médical du travail au sujet de la silicose : *M. Lengelez.*

Mai, 1937—Rapport de la commission d'étude de la réduction de la durée hebdomadaire dans les mines de houille. Fonds de prévoyance en faveur des victimes des maladies professionnelles—Dix années d'exploitation par la Société Nationale des Chemins de Fer Belges.

BULGARIA—

Statistical Institute for Economic Research, State University of Sofia, Publication No. 4, 1936—Gegenstandstheoretische Grundlagen der Wirtschaftswissenschaft und deren methodische Konsequenzen: *Peter Struve.* Über die Zerlegung statistischer Zeitreihen in drei Komponenten: *R. Zaycoff.*

CHINA—

Nankai Social and Economic Quarterly, April, 1937—The coal industry in China, I—*Leonard G. Ting.* China's international trade statistics: an evaluation: *Choh-Ming Li.*

DENMARK—

Nationaløkonomisk Tidsskrift, Hefte 2, 1937—Finansieringsproblemer i Anledning af Ekspansionen i dansk Industrie: *T. Kristensen.*

EGYPT—

L'Égypte Contemporaine, Janvier, 1937—Egypt's population problem: *W. Cleland.*

FRANCE—

Bulletin de la Statistique Générale de la France, Janvier–Mars, 1937—Tables de nuptialité et de fécondité pour la France, 1930–1932: *Pierre Depoid.*

Journal des Economistes, Mars–Avril, 1937—Le problème des matières premières: *Édouard Payen.* La valeur économique de l'Éthiopie: *E. Lémonon.*

Journal de la Société de Statistique de Paris—

Avril, 1937—Vitesse de circulation de diverses formes du stock monétaire: *G. Roulleau.* La statistique existe-t-elle en tant que discipline autonome?: *C. Penglaou.* La proportion des sexes et ses variations statistiques: *H. Decugis.*

Mai, 1937—Quarante années de la Statistique Générale de la France (1896–1936): *M. Huber.*

Juin, 1937—Perspectives statistiques sur la population, l'enseignement et le chômage: *M. Sauvy.* La loi de l'effet proportionnel: *J. d'Harcourt.*

Revue d'Économie Politique—

Mars–Avril, 1937—La crise économique à la lumière de l'expérience polonaise: *W. Zawadzki.* La pression fiscale: *U. Ricci.* Trésorerie, déficit, fonds d'égalisation: *R. Wolff.* L'activité des institutions économiques internationales: *R. Courtin* and *P. Dieterlen.* L'équilibre dans les relations économiques internationales: *C. Rist.*

GERMANY—

Blätter für Versicherungs-Mathematik, April, 1937—Sicherheitsreserve und Rückversicherung in der Lebensversicherung: *Carl Boehm.*

Weltwirtschaftliches Archiv, Mai, 1937—Einige Probleme der Finanzwirtschaft: *J. Pedersen.* Zur Zinstheorie von John Maynard Keynes: *W. Lautenbach.* Die Bedeutung starrer Preise für die Geldtheorie: *E. C. Simmons.* Über produktive und nichtinflatorische Kreditgewährung: *A. Forstmann.*

Zeitschrift für die Gesamte Versicherungs-Wissenschaft, April, 1937—Notwendigkeit und Voraussetzungen der statistischen Beobachtungen an erhöhten Risiken: *Hans Brix.* Medizinische Statistik und private Krankenversicherung: *Hans Göbbels.*

HUNGARY—

Journal de la Société Hongroise de Statistique, Nos. 1–2, 1937—The International Institute of Statistics and municipal statistics: *H. W. Methorst.* The necessity of theoretical points of view and of the establishment of theoretical aims of modern demography: *C. Balás.* On approximation and on test criteria by the χ test and by Bayes' theorem: *C. Jordan.* Quelques questions démographiques d'actualité à la lumière de la statistique: *J. de Konkoly Thege.* La mortalité cancéreuse dans les grandes villes: *J. Melly.* Il bilancio del recente miglioramento della mortalità europea: *C. Schneller.*

ITALY—

Annali di Economia—

Vol. XI—Storia economica dell' Italia nel medio evo: *Alfred Doren.* [Whole number.]

Vol. XII—Dieci anni di economia fascista: 1926–1935. [Whole number.]

Economia, Maggio, 1937—La tutela del credito: *M. Troisi.*

Le Assicurazioni Sociali—

Gennaio–Febbraio, 1937—Politica del matrimonio e della filiazione: *A. de' Stefani.* L'assicurazione malattie e la politica del Governo britannico: *Kingsley Wood.* L'assicurazione familiare e il salario: *Celestino Arena.* Gli assegni familiari in Italia: *Ugo Manunta.* "Curve" di rendimento, abilità, infortuni, nelle gare sportive: *A. Niceforo.* [A Supplement contains the second of these articles in English, the remainder in French.]

Marzo–Aprile, 1937—L'assicurazione infortuni in agricoltura nell' ordinamento corporativo: *Aldo Buffa.*

ITALY—*Contd.*

Giornale degli Economisti e Rivista di Statistica—

Marzo, 1937—La fecondità legittima milanese secondo l'età di entrambi i genitori: *Libero Lenti.* Sull' inutilità economica delle colonie: *G. Mortara.* Keynes contro i classici: una nuova teoria della occupazione, dell' interesse e della moneta: *Carlo Pagni.*

Aprile, 1937—Aspetti territoriali del movimento demografico italiano negli anni dal 1930 al 1936: *Ugo Giusti.* Armatori e spedizionieri nella raccolta e nell' istradamento dei traffici interoceanici: *Canzio Cozzi.*

Maggio, 1937—Nuove applicazioni del metodo di traslazione allo studio del fatti sociali: *Bruno Rossi.* A proposito di espressioni generali per le medie: *C. E. Bonferroni.*

SWEDEN—

Ekonomisk Tidskrift—

Häft 5–6, 1936—Nationalekonomien i stöpsleven, III: *D. Davidson.*

Häft 1, 1937—Nationalekonomien i stöpsleven, IV: *D. Davidson.*

Häft 2, 1937—Några synpunkter på konjunkturläget: *J. Åkerman.*

INTERNATIONAL—

International Labour Review—

April, 1937—Family allowances in Italy: *Bruno Biagi.* Handicrafts in India: *S. K. Raja.* Work creation policy in Germany, 1932–35, II: *L. Grebler.*

May, 1937—Some problems of international employment statistics: *J. Lindberg.* The Italian corporations at work: *Odon Por.*

International Review of Agriculture—

April, 1937—Agricultural indebtedness (concluded): *G. Costanzo.*

May, 1937—The social income and the variations from 1931–32 to 1932–33 on farms engaged mainly in live-stock production in certain European countries: Scotland, Netherlands, Germany, Austria, Denmark, Norway, Sweden and Finland.

Revue de l'Institut International de Statistique, *Livraison* 1, 1937—The population of China and its modern increase (avec résumé français): *W. F. Willcox.* Programme d'études comparées des budgets familiaux. Ses difficultés actuelles (avec résumé anglais): *G. Hostelet.*

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part II, 1937, the Society has received the publications enumerated below :—

I.—OFFICIAL PUBLICATIONS.

(a) United Kingdom.

Agricultural Research Council. Grass drying: a report prepared for the Committee on the preservation of grass and other fodder crops. London: H.M.S.O., 1937. 9¾″ × 6″. 125 pp. 2*s.*

Colonial Office—
Economic survey of the Colonial Empire (1935). 13″ × 8¼″. vi + 593 pp. 25*s.*
Customs tariffs of the Colonial Empire, Part I, Africa. 194 pp. 3*s.* Part III, West Indies. v + 253 pp. 4*s.*
[London: H.M.S.O., 1937. 9¾″ × 6″.]

Customs, Commissioners of H.M. Customs tariffs of the United Kingdom from 1800 to 1897. With some notes upon the history of the more important branches of receipt from the year 1660. London: H.M.S.O., 1897. 13″ × 8¼″. 908 + xxxvi pp. 7*s.* 6*d.* (From Mr. Scofield Thomas.)

Health, Ministry of—
Report of an investigation into maternal mortality. 353 pp. 5*s.* 6*d.*
Report on maternal mortality in Wales. 156 pp. 2*s.* 6*d.*
Nutrition, Advisory Committee on, First Report. 52 pp. 1*s.*
Reports on public health and medical subjects. 79. Cancer: memorandum on provision of radiotherapeutic departments in general hospitals. By *A. B. Smallman.* 32 pp. 9*d.* 80. Laboratory diagnosis of psittacosis. 11 pp. 6*d.* 81. Report on an outbreak of enteric fever in the County Borough of Bournemouth and in the boroughs of Poole and Christchurch. By *W. Vernon Shaw.* 25 pp. 9*d.*
[London: H.M.S.O., 1937. 9¾″ × 6″.]

Imperial Economic Committee—
Grain crops: a summary of figures of production and trade relating to wheat, wheat flour, barley, oats, maize, and rice. 9¾″ × 7¼″. 70 pp.
World consumption of wool 1936. A supplement to Wool Intelligence Notes . . . 13¼″ × 8¼″. 126 pp.
[London: H.M.S.O., 1937. 2*s.* 6*d.* each.]

Imperial Institute. Mineral Resources Department. The mineral position of the British Empire. London: the Institute, 1937. 9¾″ × 6″. 166 pp. 4*s.*

Industrial Health Research Board. Report No. 79. An investigation into sickness experience of London transport workers with special reference to digestive disturbances. By *A. Bradford Hill.* London: H.M.S.O., 1937. 9¾″ × 6″. v + 25 pp. 6*d.*

Inland Revenue, Board of. British Death Duty Acts 1796 to 1924. Supplement No. 4, containing relative matter for the years 1931–1936. London: H.M.S.O., 1937. 9¾″ × 6″. 74 pp. 2*s.* 6*d.*

Labour, Ministry of. Industrial Courts Act, 1919. Report by a court of inquiry concerning a stoppage of the London Central Omnibus Service, 1937. London: H.M.S.O., 1937. Cmd. 5464. 9¾″ × 6″. 24 pp. 4*d.*

Overseas Trade, Department of. Reports: 667. Angola. Feb. 1937. 43 pp. 9*d.* 668. Czechoslovakia, Feb. 1937. 47 pp. 1*s.* 669. Morocco, 1935–1936. 73 pp. 1*s.* 6*d.* London: H.M.S.O., 1937. 9¾″ × 6″. 3 parts.

Registrar-General, Northern Ireland. Census of population . . . 1937. Preliminary report. Belfast: H.M.S.O., 1937. 13″ × 8¼″. vi + 20 pp. 1*s.*

(a) United Kingdom—*Contd.*

Trade, Board of—

Report by the Food Council to the President of the Board of Trade for the year 1936. 26 pp. 6*d.*

Report of the Import Duties Advisory Committee on the present position and future development of the iron and steel industry. Cmd. 5507. 117 pp. 2*s.* [London: H.M.S.O., 1937. 9¾″ × 6″.]

Transport, Ministry of—

Report of the Committee on the regulation of wages and conditions of service in the road motor transport industry (goods). 9¾″ × 6″. 56 pp. 1*s.*

Road traffic census 1936. Report including tables of statistics of traffic recorded on class II roads in Great Britain at the general census taken in August 1936. 13½″ × 8¼″. 29 pp. 1*s.* 6*d.*

[London: H.M.S.O., 1937.]

(b) Dominions, Colonies, and Protectorates.

India—

Bombay Labour Office. General wage census, Part I. Perennial factories. Third report. Bombay, 1937. 9½″ × 6″. ix + 265 pp. 1*s.* 3*d.*

British Malaya—

Census . . . 1921. By *J. E. Nathan.* London, 1932. 13″ × 8¼″. 406 pp. (From Mr. Scofield Thomas.)

Canada—

Dominion Bureau of Statistics. Seventh census . . . 1931. Vol. IX. Institutions. 495 pp. $1. Vol. XI. Merchandising and service establishments, Part II. Retail services—wholesale trade—retail chains—hotels. Distribution of sales of manufacturers. 1298 pp. $1. [Ottawa, 1934–35. 9¾″ × 6½″.]

New Zealand—

Papers and reports relating to minerals and mining; comprising Statement of the Minister of Mines, Report on the goldfields, Report on the coal mines, Report on State coal mines. Wellington, 1903. 13″ × 8¼″. 16 + 244 + 43 + 4 pp.

Lands and Survey, Department of. Reports of the Department, 1900–01. 1901–02. Wellington, 1901–02. 13″ × 8¼″. 2 vols.

[From Mr. Scofield Thomas.]

South Australia—

Statistical register, 1885, 1891. Adelaide, 1887, 1893. 12¾″ × 8¼″. 2 vols. (From Mr. Scofield Thomas.)

Union of South Africa—

Census and Statistics, Office of—

Report of the inquiry into the expenditure of European families in certain urban areas, 1936. 13″ × 8″. 83 pp.

Statistics of afflicted persons (blind, deaf, dumb, and epileptic) in the Union of South Africa and South West Africa, collected during May 1936. 12½″ × 9¾″. viii + 26 pp.

[Pretoria, 1937. 2*s.*]

Cape of Good Hope. Statistical register of the Colony . . . 1886, 1887, 1888, 1897. Cape Town, 1887–1898. 12¼″ × 8¼″. 4 vols.

Natal. Statistical year book. 1897, 1898, 1900, 1901, 1902, 1903, 1904, Pietermaritzburg, 1898–1905. 9½″ × 6″. 7 vols.

[From Mr. Scofield Thomas.]

(c) Foreign Countries.

Argentina—

Comisión Nacional del Censo Industrial. Censo industrial de 1935, resultados generales (cifras provisionales). Buenos Aires, 1937. 10¾″ × 8½″. 41 pp.

Bulgaria—

Direction Générale de la Statistique. Statistique des prix des marchandises dans le commerce de gros et de détail. Sofia, 1937. 11½″ × 8″. vi + 117 pp. 60 *lévas.*

Czechoslovakia—

Office de Statistique. Recensement de la population . . . de Ier décembre 1930. IIe Tome. Profession de la population, Ière partie. Prague, 1934. 12¼″ × 9¼″. 40 + 54 + 403 pp. 110 *Kč.*

France—

Statistique Générale de la France. Statistique des forces motrices en 1931, avec une appendice sur la statistique des forces motrices en divers pays. Paris, 1936. 10½″ × 8½″. 262 pp.

Germany—

Institut fur Konjunkturforschung. Sonderheft 44. Energiequellen der Welt. Betrachtungen und Statistiken zur Energiewirtschaft. Berlin, 1937. 11½″ × 8½″. 78 pp. 7.80 *Rm.*

Statistisches Reichsamt. Statistik des deutschen Reichs. Band 495, Die Bewegung der Bevolkerung in den Jahren 1932, 1933, und 1934. Die Ursachen der Sterbefalle in den Jahren 1932, 1933, und 1934. Heft 2. Tabellenteil. 301 pp. 14 *Rm.*

—— Band 499. Die Einkommen- und Korperschaftsteuerveranlagung fur 1934. 158 pp. 7 *Rm.* [Berlin, 1937. 12″ × 8½″.]

Berlin. Statistisches Amt. 75 Jahre Berliner Statistik, herausgegeben von Statistischen Amt der Reichshauptstadt Berlin. Berlin, 1937. 9¾″ × 7″. 87 pp.

Hungary—

Budapest. A székesfővàros multja és jelene számokban. Budapest, 1934. 10¼″ × 7¼″. 35 + 523 pp.

Italy—

Istituto Centrale di Statistica—

Annali di statistica. Serie VI. Vol. XXXVIII, Atti del Consiglio Superiore di Statistica sessione ordinaria 21 dicembre, 1936. Rome, 1937. 10¼″ × 7¼″. 19 + 215 pp. *L.* 15.

VIII censimento generale di popolazione 21 aprile 1936. XIV. Popolazione residente e popolazione presente secondo le categorie di attività economica, in ciascun comune del regno. 116 pp. *L.* 10.

—— Vol. II. Province. Fasc. 36–40, 42–59, 61, 63–68, 70, 73–79. 38 parts. *L.* 40 each. [Rome, 1937. 12″ × 9″.]

Latvia—

Finance, Ministry of. The Latvian Economist. Compiled by *H. Bokalders,* Editor in Chief of the "Ekonomists." Riga, 1937. 10″ × 7″. 139 pp.

Norway—

Det Statistiske Centralbyrå. Norges Offisielle Statistikk. IX—110. Beitetellingen 1935. Aperçu du pâturage en Norvège basé sur un recensement représentatif. 178 pp. *Kr.* 2.

115. Élevage d'animaux à fourrure au Ier Septembre 1936. 49 pp. *Kr.* 1.50. [Oslo, 1937. 9¾″ × 6¼″.]

(c) Foreign Countries—*Contd.*

Poland—

Office Central de Statistique. Deuxième recensement général de la population du 9 decembre 1931. Logements et ménages, population, professions. Ville de Warszawa. Warsaw, 1937. 11½″ × 8¼″. xxxi + 289 pp.

Spain—

Ministerio de Agricultura. Anuario estadistico de las producciones agricolas. Año 1935 y 1936 para los agrios y el olivo. Madrid, 1936. 9½″ × 6½″.

Switzerland—

Zürich. Statistisches Amt. Sterblichkeit in der Stadt Zürich 1893–1933. Zürich, 1937. 8¼″ × 5¾″. vii + 286 pp. 3 *fr.*

United States—

Children's Bureau—

Publication nos.: 143. Child management. 107 pp. 10*c.* 235. Juvenile court statistics 1934, and federal juvenile offenders 1934–35. 106 pp. 15 *c.* 237. Trends in different types of public and private relief in urban areas. 143 pp. 15 *c.*

Women's Bureau—

Bulletins: 144 (revision of 98). State labor laws for women. 93 pp. 15 *c.* 123. Employment in hotels and restaurants. 105 pp. 15 *c.* 149. Employment of women in Tennessee industries. 63 pp. 10 *c.* 150. Women's employment in West Virginia. 27 pp. 10 *c.*
[Washington, 1937. 9″ × 6″.]

(d) International.

International Labour Office—

Studies and reports, series B, no. 24. Some social aspects of the present and future economic development in Brazil. By *F. Maurette.* Geneva (London: P. S. King), 1937. 9″ × 6″. 99 pp. 2*s.*

League of Nations—

Economic and financial section. Committee of statistical experts. Report to the Council on the work of the sixth session . . . April 19 to 24, 1937. Geneva, 1937. 13″ × 8½″. 21 pp.

Economic and intelligence service—

Prosperity and depression: a theoretical analysis of cyclical movements. By *Gottfried von Haberler.* 9¼″ × 6″. xv + 363 pp. 7*s.* 6*d.*

Statistical year-book, 1936–37. 9¾″ × 7½″. 330 pp. paper 10*s.* cloth 12*s.* 6*d.* [Geneva (London: Allen and Unwin), 1937.]

II.—AUTHORS AND MISCELLANEOUS.

American Academy of Political and Social Science. Pamphlet series.
No. 4. Modernizing our state legislatures. By *A. E. Buck.* 45 pp.
No. 5. The economics of isolation. 54 pp.
[Philadelphia, 1936–7. 9¼″ × 6¼″. 50 *c.*]

American Institute of Actuaries, The record of. Index to vols. 16–25. [1927–1936.] Chicago: the Institute, 1937. 8½″ × 5¾″. iv + 113 pp.

American Statistical Association and the Social Science Research Council. Government statistics: a report of the committee on government statistics and information services. New York, 1937. 9″ × 6″. xiv + 174 pp.

The Banker. Vol. XXIV, No. 96, Jan. 1934, to Vol. XLIII, No. 138, July 1937 (except No. 133, Feb. 1937). London: Financial News, 1934–1937. 9¾″ × 6½″. 42 parts.

Baster (*A. S. J.*). The twilight of American capitalism: an economic interpretation of the New Deal. London: P. S. King, 1937. 8½″ × 5½″. viii + 218 pp. 9*s.*

II.—Authors and Miscellaneous—*Contd.*

Brunner (*E. de S.*) and *Lorge* (*Irving*). Rural trends in depression years: a survey of village centred agricultural communities 1930–1936. New York: Columbia University Press (London: H. Milford), 1937. 9" × 6". xvi + 387 pp. 16*s.* 6*d.*

Burton (*Clement*). A concise manual of statistics (with special reference to the requirements of students for municipal examinations). London: Gee & Co., 1937. 8¼" × 5½". ix + 163 pp. 7*s.* 6*d.*

Cartan (*Élie*). La topologie des groupes de lie. (Actualités scientifiques et industrielles, 358). Paris: Hermann, 1936. 9¾" × 6½". 28 pp. 10 *fr.*

Cole (*G. D. H.*), Editor. What everybody wants to know about money: a planned outline of monetary problems, by nine economists from Oxford. Colin Clark, G. D. H. Cole, E. F. M. Durbin, H. T. N. Gaitskell, E. L. Hargreaves, R. F. Harrod, G. R. Mitchison, E. A. Radice, A. Vallance London: Gollancz, 1936. 7¼" × 5". 544 pp. 5*s.*

Darmois (*Georges*). Méthodes d'estimation. (Actualités scientifiques et industrielles, 356). Paris: Hermann, 1936. 9¾" × 6½". 31 pp. 10 *fr.*

Fisher (*Irving*) and *Filene* (*Edward A.*). Do high wages make prosperity . . . Reprint from *The Forum*, 1936. 11¼" × 8¼". 8 pp.

Gear (*H. S.*). Disease incidence in China: an analysis of hospital records for 1934. Pp. 949-972.

—— Epidemiological notes on scarlet fever in China. Pp. 203–210.
[Chinese Medical Association Hospital Survey. Reprints from the *Chinese Medical Journal*, 1936–37. 9¾" × 7".]

Goring (*Charles*). The English convict: a statistical study. 13" × 8¼". 440 pp. 9*s.* Schedule of measurements, general anthropological data. 9¾" × 24½". 172 pp. 5*s.* London: H.M.S.O., 1913. (From Mr. Macrosty).

Grant (*A. T. K.*). A study of the capital market in post-war Britain. London: Macmillan, 1937. 8½" × 5½". xx + 320 pp. 12*s.*

Gumbel (*E. J.*). La distribution de Galton. Travaux de l'Institut de Science Financière et d'Assurances, Université de Lyon, No. 53. 1937. 11" × 8½". 16 pp. (From the author.)

Hays (*Samuel*). An outline of statistics. London: Longmans Green, 1937. 7¾" × 5". vii + 215 pp. 6*s.*

Heller Committee for Research in Social Economics. Quantity and cost budgets for I, family of an executive, II, family of a clerk, III, family of a wage earner, IV, dependent families or children. Prices for San Francisco. October 1936. Berkeley: University of California, 1937. 11" × 8½". 80 pp. 40 *c.*

Herrmann (*Conrad*). Die Textilrohstoffversorgung Deutschlands. Kieler Vortrage . . . 48. Jena: Gustav Fischer, 1937. 9½" × 6¼". 31 pp.

Hill (*A. Bradford*). Principles of medical statistics. London: the Lancet, 1937. 8½" × 5½". vii + 171 pp. 6*s.*

Holford (*W. G.*) and *Eden* (*W. A.*). The future of Merseyside: town and country planning schemes. Liverpool: University Press, 1937. 8½" × 5½". 84 pp. + 2 maps. 2*s.* 6*d.*

Hoover (*Edgar M.*). Location theory and the shoe and leather industries. Cambridge, Mass.: Harvard University Press (London: H. Milford), 1937. 8¾" × 6". xvii + 323 pp. 15*s.*

International Chamber of Commerce. British National Committee. Trial census of distribution in six towns. London, 1937. 9¾" × 7¼". 2*s.*

Ishii (*Ryoichi*). Population pressure and economic life in Japan. London: P. S. King, 1937. 8½" × 5½". xix + 259 pp. 12*s.* 6*d.*

Janko (*Jaroslav*). Základy statistické indukce. Prague: Státni Úřad Statistický, 1937. 9½" × 6¾". 224 pp. 40 *Kč.*

Johnson (*A. E. J.*). Predecessors of Adam Smith: the growth of British economic thought. London: P. S. King (New York: Prentice-Hall), 1937. xii + 426 pp. 15*s.*

Joshi (*N. M.*). Urban handicrafts of the Bombay Deccan. Poona: Gokhale Institute of Politics and Economics, 1936. 9¾" × 6". 207 pp. *Rs.* 2.

Kretschmann (*J. G.*). Autarchia economica e finanziaria ed economia mondiale. Padua: CEDAM, 1937. 10" × 7". vi + 145 pp. *L.* 18.

II.—Authors and Miscellaneous—*Contd.*

Lester (*Richard A.*). Sweden's experience with "managed money". Supplement to *Svenska Handelsbanken's Index*, Stockholm, 1937. 9¼″ × 6½″. 32 pp. 1 *Kr.*

Lynden (*Baron R. A. de*). The curse of credit. London: Longmans Green, 1937. 8½″ × 5½″. xxxv — 254 pp. 10*s*. 6*d*.

London Passenger Transport Board. First annual report and statement of accounts and statistics for the year ended 30 June, 1934. 2nd report, 1934–1935. 3rd report, 1935–1936. London: the Board, 1935–1937. 13″ × 8″. 3 parts. 1*s*. each.

Martin (*W. J.*). Studies in the declining birth-rate, the Midlands and London. Reprint from *Journal of Hygiene*, Vol. XXXVII, No. 2, 1937. 9¾″ × 7″. Pp. 188–224. (From the author.)

Mitrany (*David*). The effect of the War in South-eastern Europe. New Haven: Yale University Press (London: H. Milford), 1936, for the Carnegie Endowment for International Peace. 9½″ × 6½″. xiii + 280 pp. $3.

Montgomery (*J. K.*). The mathematical problem of the price index. London: P. S. King, 1937. 7¼″ × 4¾″. 74 pp. 6*s*.

Morton (*N. W.*). Individual diagnosis: a manual for the employment office. Montreal: McGill University, 1937. 10″ × 7″. 123 pp. 5*s*. 6*d*.

National Bureau of Economic Research. A programme of financial research: report of the exploratory committee on financial research . . . Vol. I. New York: the Bureau, 1937. 8½″ × 5½″. 81 pp. 4*s*. 6*d*.

Nicolesco (*M.*). Les fonctions polyharmoniques. (Actualités scientifiques et industrielles, 331). Paris: Hermann, 1936. 9¾″ × 6½″. 53 pp. 15 *fr*.

Ore (*Oystein*). L'algèbre abstraite. (Actualités scientifiques et industrielles, 362). Paris: Hermann, 1936. 9¾″ × 6½″. 52 pp. 15 *fr*.

Pabst (*W. R.*). Butter and oleomargarine: an analysis of competing commodities. New York: Columbia University Press (London: P. S. King), 1937. 8¾″ × 5¾″. 112 pp. 6*s*. 9*d*.

P.E.P. (Political and Economic Planning). Report on international trade: a survey of problems affecting the expansion of international trade, with proposals for the development of British commercial policy and export mechanism. 302 pp. 8*s*. 6*d*.

—— Report on the British social services: a survey of the existing public social services in Great Britain with proposals for future development. 210 pp. 7*s*. 6*d*. [London: P.E.P., 1937. 10″ × 8″.]

Pittsburgh. University of. Bureau of Business Research. Real property inventory of Allegheny County. A survey of housing and related conditions . . . Pittsburgh: Bureau of Business Research, 1937. 11″ × 8½″. 311 pp. $5.

Platrier (*C.*). Les axiomes de la mécanique newtonienne. (Actualités scientifiques et industrielles, 427). Paris: Hermann, 1936. 9¾″ × 6½″. 58 pp. 14 *fr*.

Population Investigation Committee. The future of our population. London: the Committee, 1937. 8½″ × 5½″. 31 pp. 6*d*.

Punjab. Board of Economic Inquiry. Publication nos. 42. Condition of weights and measures in the Punjab . . . xii — 88 pp. 8 *as*.

—— 47. Economics of lac industry in the Punjab . . . vii — 78 pp. 8 *as*.

—— 48. An economic survey of Suner, a village in the Ferozepore District of the Punjab . . . xxx — 267 pp. 3 *rupees*.

—— 49. Some factors affecting the price of wheat in the Punjab . 108 pp. 8 *as*. [Lahore: C. & M. Gazette, 1937. 9¾″ × 6½″.]

Riches (*E. J.*). Agricultural planning and farm wages in New Zealand. 9½″ × 6½″. 38 pp. 6*d*.

—— The restoration of compulsory arbitration in New Zealand. Geneva. 9½″ × 6½″. 39 pp. 6*d*.

[Geneva: reprints from *International Labour Review*, 1936–37.]

Robbins (*Lionel*). Economic planning and international order. London: Macmillan, 1937. 7½″ × 5″. xv — 330 pp. 8*s*. 6*d*.

Roos (*C. F.*). N.R.A. economic planning. Bloomington, Indiana: Principia Press (London: Williams and Norgate), 1937. 9¾″ × 6½″. xxii + 596 pp.

II.—Authors and Miscellaneous—*Contd.*

Rowntree (*B. Seebohm*). The human needs of labour. New ed. revised. London : Longmans, Green, 1937. 7¼″ × 5″. 162 pp. 2*s*. 6*d*.

Royal Institute of International Affairs. The problem of international investment : a report by a Study Group of Members of the Royal Institute of International Affairs. London : Oxford University Press, 1937. 9¼″ × 6½″. x + 371 pp. 18*s*.

Santalo (*L. A.*). Integralgeometrie 5. Über das kinematische Mass im Raum. (Actualités scientifiques et industrielles, 357). Paris : Hermann, 1936. 9¾″ × 6½″. 54 pp. 18 *fr.*

Sarkar (*B K.*). The sociology of population, with special reference to optimum standard of living and progress : a study in societal relativities. Calcutta : Ray-Chowdhury, 1936. 9½″ × 6″. 139 pp. 3 *rupees.*

Say (*Jean Baptiste*). Letters to Thomas Robert Malthus on political economy and stagnation of commerce. Translated, London, 1821. With an historical preface by *Harold J. Laski.* London : George Harding, 1936. 8¾″ × 5¾″. 75 pp. 5*s*.

Shephard (*C. Y.*). The cacao industry of Trinidad : some economic aspects. Series II. A financial survey of estates during the seven years 1923–24 to 1929–30. 32 pp. 20 diagrams. Series III. An examination of the effects of soil type and age on yield. Series IV. Recommendations for improving the efficiency of estates. 101 pp. [Trinidad, 1937. 11″ × 8½″. 2 parts.]

Sheppard (*W. F.*). Graduation by reduction of mean square or error. Reprinted from *Institute of Actuaries Journal*, Vol. XLVIII, pp. 171–185, pp. 390–412. Vol. XLIX, pp. 148–157. 1914–15. 8¾″ × 5¾″. 3 parts.

—— Central difference interpolation formulae. Reprint from *Institute of Actuaries Journal* of Oct. 1916. Pp. 85–99. 8¾″ × 5¾″.

—— Reduction of error by linear compounding. Reprint from *Royal Society Philosophical Transactions*, Ser. A., Vol. 221, pp. 199–237, 1920. 12″ × 9″.

—— The fit of a formula for discrepant observations. Reprint from *Royal Society Philosophical Transactions*, Ser. A., Vol. 228, pp. 115–150, 1927. 12″ × 9″.

—— The relation between probability and statistics. *Faculty of Actuaries Transactions*, No. 108, 1928. pp. 25–40. 8¾″ × 5½″.

—— Variety of method in the teaching of arithmetic. Reprint from *Mathematical Gazette*, July, 1929, pp. 477–489. 8¾″ × 5½″.

—— Mathematics for the study of frequency statistics. Reprint from *Mathematical Gazette*, Dec. 1930, pp. 231–250. 8¾″ × 5½″.

—— Multiplication and division of integers and decimals. Reprint from *Mathematical Gazette*, May 1931, pp. 382–389. 8¾″ × 5½″.

—— Interpolation by means of given differences (central-difference notation. Extract from *Edinburgh Mathematical Society Proceedings*, Series 2, Vol. III, Part I, 1931. 9¾″ × 7¼″.

—— On some expressions of a function of a single variable in terms of Bessel's functions. Extract from *Quarterly Journal of Mathematics*, No. 91, 1888, pp. 223–260. 8¾″ × 5½′.

JOURNAL

OF THE ROYAL STATISTICAL SOCIETY

PART IV, 1937.

THE PUBLIC SOCIAL SERVICES.

By SIR GWILYM GIBBON, C.B., C.B.E., D.Sc.

[Read before the ROYAL STATISTICAL SOCIETY, May 24th, 1937, the PRESIDENT, THE RT. HON. LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C., in the Chair.]

PART I.

THE last official return of the "public social services" showed that in the year 1900–1 less than £32m. was spent in England and Wales on the services included in the return, in 1910–11 £55m., in 1934–35 £427m. These are amazing figures, even in these expansive days. I have divided my paper into two parts, the first of some general observations, the second of more detailed facts, with some comments by the way. The subject is so wide and my paper in comparison so short that some of my remarks have had to be compressed into not much more than notes. I am indebted to a number of persons, and especially to Mr. and Mrs. R. F. George, for assistance in preparing the paper: I alone am responsible for comments.

1. *The Official Return.*

The first return was issued in 1920, and it is now made annually. It was prepared mainly at the instance of persons who were perturbed at the large growth of public expenditure for the personal needs of members of the community, and is often referred to as the Drage return, after Mr. Geoffrey Drage, to whose persistence it was largely due.

The return is somewhat of a hotchpotch. It includes three broad classes of services (though the divisions are not clean-cut): those for maintaining persons in need at the public expense (the support services); those where provision by the beneficiaries is subsidized (the contributory services); those provided by State and Local

Authorities as general communal services for the benefit of the community as a whole as much as for that of the individual (the general services). A fourth class can be added, that of War Pensions, where the expenditure is in return for services rendered, though some may consider that they go beyond this limit.

The first group includes public assistance (poor relief), unemployment allowances and non-contributory old-age pensions (with some qualifications); the second, unemployment and health insurance, contributory pensions and housing (though on a different basis from the others); the third, education, maternity and child welfare and a number of other services. The full list of services included in the official return is set out in the first table in the appendix, which states the expenditure for a number of years.

The return is incongruous. Education, for instance, is a different class of social service, with different implications, from public assistance. The return contains too little or too much. Too little because there are many other social services at public expense. The first return did, in fact, include public health expenditure on such matters as the collection and disposal of refuse. But accepting as good the exclusion of such services as these, if education be included why omit her stepsister, public libraries, even though the latter be used more to divert than to instruct, or, still more, if maternity and child welfare are included why not also welfare of the blind, or, indeed, why include unemployment allowances but omit other measures for helping the unemployed including money spent in stimulating provision of work or for the Special Areas or on transference or training, even if we stop short of including Employment Exchanges in general?

The return was conceived in some confusion and controversy. It should be retained, but endeavour should be made to improve it, even though this is by no means so simple a task as it may seem to the uninitiated. I suggest that the Society should consider the subject and make definite proposals to that end.

2. *The Public Social Services as a Whole.*

As already stated, the total expenditure in England and Wales for the year ended March 1935 (but the previous year for some services: see footnote to Table I of the appendix) was £427m. For convenience, I will limit my comments to England and Wales, except where otherwise stated.

There has been a steady rise in the years since the war, with some small breaks. Contributory pensions appear first in the tables in 1925–26 and unemployment allowances first in 1930–31, as "transitional payments," but in effect had appeared in earlier years as part of unemployment benefit, under the names of uncovenanted or transitional benefit. There have been other material changes, to some of which reference will be made later.

The new era of public provision for personal needs began with old age pensions in 1908, and was continued by assisted health and unemployment insurance, the former on a comprehensive, and the latter at first on a modest, scale. The new era was manifested also in other directions, in particular in the work of Local Authorities.

A better indication of the increased scope of the public social services is afforded by the expenditures per head of population, which in round figures are as follows :—

1890–91.	1900–1.	1910–11.	1924–25.	1934–35.
Under 15*s.*	Just under 20*s.*	Over 30*s.*	Over 150*s.*	Over 210*s.*

In the later years account has to be taken of the changed value of money.

Taking now what I call the maintenance social services of unemployment insurance and allowances, health insurance, contributory pensions, old age pensions, public assistance and assisted housing (but omitting the general hospitals of Local Authorities, school medical treatment, the feeding of school children and material aid given in connection with maternity and child welfare because separate figures are not stated in the official return; the figures for most of them will be given later in this paper), the figures are as follows, the first stating the total expenditure, the second that per head of population :—

1890–91.	1900–1.	1910–11.	1924–25.	1934–35.
£9m.	£12m.	£22m.	£148 m.	£277m.
6*s.*	Under 7*s.* 6*d.*	Over 12*s.*	Over 76*s.*	Over 137*s.*

The increases are larger than for the social services as a whole, and indicate the bigger place now held by maintenance services in the realm of government.

Comparison of the Several Services.—The several services are set out in order of expenditure for 1934–35 in the table on page 498, except that some related items are put together, and maintenance services are distinguished from general services.

The £389·8m. is brought up to the £426·8m. of the official return by adding £37m. for War Pensions. The figures include cost of administration.

The relative expenditures on the several services repay attention. Thus, that on education is nearly three times that on health insurance and more than twice that on housing; this is for gross expenditures, the disparities in those out of public funds would be much greater. Expenditures on the several services are now determined largely by sectional pressures, and there is a case for more systematic means for settling claims from the standpoint of the community as a whole. The expenditure on each service depends upon public policy, though that on unemployment must depend largely (but by no means wholly) on economic conditions, and that on old age pensions must increase with the number of the aged.

SERVICES.		GROSS EXPENDITURE, £m.	
Maintenance.	General.	Maintenance.	General.
	Education		91·9
	Approved Schools		0·5
Unemployment Benefit		46·5	
Unemployment Allowances		38·2	
Public Assistance		42·6	
Housing		40·2	
Contributory Pensions		38·5	
Old Age Pensions		37·8	
National Health Insurance		32·8	
	Hospitals and Treatment		12·4
	Maternity and Child Welfare		3·1
	Mental Treatment		2·8
	Mental Deficiency		2·5
	Totals	276·6	113·2
	GRAND TOTAL	389·8	

Changes in Expenditure on the Several Services.—Comparing the years since 1924–25, the several services may be divided into—(1) those where the expenditure has been relatively steady (this is notably so in health insurance); (2) those with largely different expenditures in different years because dependent on varying outside conditions (this applies, of course, particularly to unemployment payments, which ranged from the enormous total, benefits and allowances, of nearly £106m. in 1931–32 to just over £38m. in 1927–28; the differences also to some extent reflect different policies); (3) those with increases due to natural conditions (the most notable being old age pensions); (4) increases due primarily to policy (policy influences all services, but is mainly responsible for increases in education and housing). War Pensions provide the solitary crumb of comfort to the burdened taxpayer by showing a reduction, due to natural conditions.

Public Expenditure on the Social Services.—In 1910–11 nearly the whole of the £55m. spent on the "public social services" came from public funds, central and local; in 1934–35 over £300m. was provided from public funds (including the State contribution towards contributory pensions). The increase in the total from public funds has been relatively small since 1923–24, but that is because of the reduced expenditure on war pensions. The increases have been large for unemployment benefit and allowances, old age pensions, education and housing.

An outstanding fact is the much larger proportion of public money provided from central sources. This is to be attributed primarily to State aid for insurance and pension schemes, State provision for the unemployed and war pensions, partly also to the larger contribution from the Exchequer towards local expenditure, including compensation for the derating of certain classes of property. Comparing 1934–35 with 1910–11, central payments were over eight times as large; local (including block grants in 1934–35) nearly four times.

The following statement sets out the percentage of income in 1934–35 received from public funds :—

100 per cent.—Old age pensions (age 70 and over), unemployment allowances; also war pensions.
90–100 per cent.—Education, public assistance, hospitals and treatment of disease, mental deficiency.
80–90 per cent.—Approved schools, maternity and child welfare.
50–60 per cent.—Mental treatment.
40–50 per cent.—Housing, contributory pensions.
30–40 per cent.—Unemployment insurance.
10–20 per cent.—National health insurance.

(The above percentages are based on the figures in the official return of social services. In that return the expenditure (for 1933–34) on mental hospitals is given as £2·77m. and the sum provided from public sources as £1·59m. In the Ministry of Health return the corresponding figures (but for local expenditure only) are £8·83m. and £6·96m., giving a percentage of public moneys of nearly 79 per cent. The reason for the difference is that in the social services return the expenditure and income for rate-aided patients are included under public assistance, not under mental hospitals. It would be well if the two returns were made on the same basis. The Ministry of Health return gives the better picture.)

In interpreting the foregoing figures it has to be borne in mind that in unemployment allowances and in public assistance account is taken of means before public funds are expended, whereas in some other services (and to some extent also in public assistance) service is rendered and repayment sought, or supposed to be sought, according to means. The much lower public contribution towards health than towards unemployment insurance is noteworthy, about one-sixth as compared with about one-third. For housing the proportion is about two-fifths, but for the particular persons who happen to occupy "assisted houses," though others may receive some indirect benefit in lower rents.

3. *National Income and Expenditure on the Social Services.*

Not more than a broad comparison is necessary for my present purpose. From estimates which have been made, I shall assume that the average national income per head was £47 in 1910–11, £79 in 1924–25 and £83 in 1934–35. On these figures the percentages of the national income spent on the public social services from public funds were respectively just over 3, about 7½, just over 9. The last figure can scarcely be said to be exorbitant.

In recent years reformers have tended to concentrate on distribution. The figures serve to emphasize the abiding fact that production is the first concern, and that ability to provide services must depend primarily on the wealth that is produced. The danger lies in the risk that social services may be pushed so high or be of such a nature or be so administered that the progress of production may be halted.

It has been estimated that some £340m. was spent in England and Wales in 1934 on liquor and tobacco, which compares with £427m. (£307m. receipts from public funds) on all the public social services of the return and £277m. (£168m.) on the maintenance services. The yield in the United Kingdom in 1934–35 from income tax and sur-tax was £280m. and from customs and excise £290m.

How much a nation can afford to spend from public funds on social services will depend largely on the excess of income over that needed for primary necessities and comforts. That excess has increased largely in recent decades, has increased even in recent years despite the troubles, and can reasonably be expected to go on increasing, always provided that advances in production are not hindered. There is, of course, a fond belief that expenditure on the social services is repaid in improved efficiency. There is, however, much to be said for the part of a reservation by two signatories of the report of the Royal Commission on Health Insurance where they said: "Expenditure on social services is not infrequently supported by reference to the economies which will elsewhere result; it is difficult . . . to find instances where such hopes had been adequately realized . . . the case for expenditure on health is not in fact furthered by what, we are convinced, is the fallacious suggestion that expenditure on health may indirectly help to rehabilitate the finances of the country" (p. 294). In this connection, I commend to the attention of my readers the significant figures given later in the paper of the increase in poor relief (see p. 528).

4. *The Burden on Industry.*

The employer has at present to provide a weekly sum of 3*s.* 2*d.* for the social insurance services (unemployment, health and pensions) for each adult man employed, half of the sum being payable by the employed person: the rates for other employed persons are lower, as are also those for men in agriculture. If average weekly earnings be taken at 50*s.*, the 3*s.* 2*d.* comes to 6⅓ per cent.; if 55*s.* be taken, 5¾ per cent.* Account must be taken of other charges, in particular workmen's compensation (not, however, on all fours with the services mentioned), where payments for the United Kingdom in 1935 amounted to £5·7m.; and we are by no means at the end of the public social services.

It was strongly represented to the Royal Commission on Health Insurance "that industry cannot bear any further burden at present, and, indeed, that the need for some alleviation . . . is most urgent" (pp. 69–70 of report, 1926). The National Confederation of Employers' Organizations submitted figures purporting to show that, for poor relief, workmen's compensation, old age pensions and health and unemployment insurance (not including, be it observed, contributory pensions, which began to operate in 1926), the cost per head in Great Britain was 78*s.* 6*d.*, as compared with, for example, 37*s.* 6*d.* in Germany and only 3*s.* 6*d.* in Italy. The value of the comparisons is doubtful. Because of such comparisons, the International Labour Office appointed a committee of investigation, and they reported that it was not possible to make any international comparison and that to do so would "inevitably lead to wrong conclusions"—which seems too pessimistic an attitude, given, above all, the right investigators. (The charges for social services are now heavier in some countries than in this: a comprehensive return on the subject has recently been issued by the International Labour Office.)

What is the real incidence of the charges for social services? I do not know that anyone is in a position to do much more than to parade some generalities. That an employer has to make a contribution or that an employed person has a sum deducted from his earnings is not by any means conclusive that in the long run each bears the burden. The incidence will differ in different industries according to the measure in which, for instance, they are subject to competition from quarters free from similar obligations and can pass on the charges, or in which they lend themselves to improved efficiency and can thus ultimately save charges put upon them, in whole or part. The whole subject is highly recondite, one where it is difficult to obtain sound data, but nevertheless extremely important for practice. The one comfort—and the only reason, some may say, why Chancellors of the Exchequer should sleep easily—is that over a long period of years, taxes, rates and charges tend to work out their own equities, but that comfort is qualified by the fact that in the meantime some industries may be permanently crippled. Anyway, in recent years charges for social services have probably been of minor importance compared with other difficulties with which industries have been confronted, even though the Royal Health Insurance Commission said, in terms more sonorous than helpful, "We feel that there may come a time, and that in fact there has come a time, that the State may justifiably turn from searching its conscience to exploring its purse. . . ." (pp. 72–3).

---

* Mr. Ramsbottom stated that he considered these averages too low (*see* p. 554). If average weekly earnings be taken at 60*s.* the percentage is a little under 5·3; if 65 be taken it is a little under 4·9.

5. *The "Philosophy" of the Social Services.*

The poor law is a residual service for those in need, in its origin with little stigma and motived as much by a desire to provide work as to relieve the impotent. The new social services of the last century emerged from the troubles of the industrial towns, and the man who preached strictness in poor relief, Edwin Chadwick, was also one of the leading pioneers of the new services, nor did he consider that there was any inconsistency but, on the contrary, regarded the two attitudes as complementary. The first services were chiefly environmental, including treatment of infectious diseases, undertaken as much for protecting the community as for curing the sick. None of the measures was intended to relieve individual responsibility.

The modern era of the social services began only in the present century. The measures which were taken were grafted on to individual responsibility. Old age pensions, health and unemployment insurance, and later contributory pensions were not intended for complete provision, but as an aid and stimulus to private provision; in a way the measures were a triumph of reality over idealism.

In one sphere, however—that of provision for unemployment—there has been a radical change of outlook, from partial to full provision. The change has arisen from pressure of circumstances. There is no inherent reason why full provision should be made for unemployment and only partial for sickness, and the change is the more marked because the original provision was for 7*s*. a week in unemployment benefit and 10*s*. a week (with possibility of more) in sickness benefit. A growing demand for as liberal provision in sickness as in unemployment may be expected, though the situation is eased by the additional benefits which are given by Approved Societies (see p. 521).

Two other innovations introduced by the insurance group of social services may be noted—compulsion and contributions by employers. The first was not new in the social services, but had not hitherto been applied to provision by individuals for their own necessities; and, though now taken almost for granted, as was formerly compulsion in religion, has germs of danger and may still be found difficult to reconcile with genuine democracy.

Compulsory contributions by employers as such were new; workmen's compensation provides some, but not altogether a pertinent, precedent. It can obviously be justified on the ground that an industry which does not yield sufficient for the needs of its workers is parasitic. But future historians may find it queer that a generation which thought it right to tax industries for provision towards sickness, unemployment and pensions found it right also largely to relieve them of taxes for local services.

6. *Population Changes.*

The population question is definitely in the news, none too soon. Only broad estimates are, of course, possible of the future, but, while alarming figures on the assumption that past rates of decline will continue unabated may probably be ignored, a substantial reduction is practically certain.

The repercussions on social services must be great. (One of the best short examinations of the subject, though open to criticism in some respects, is in a booklet, *Expected Population Changes and their Effect upon the Social Services*, by Norman Wilson, one of a research series issued by the Institute of Public Administration.) There will be far fewer children and many more aged persons. The position will be almost pathological; the general balance of the community will be upset, though this may be modified to some extent by immigration if the decline proceeds far, possibly with consequences not altogether to be welcomed.

I have not space here to deal at any length with the repercussions on the social services, and will refer only to a few matters, and first some general considerations. The community is expending great efforts to build up a sound and alert population of children and youth; and at the same time the members of the community are securing that there shall be fewer and fewer of them. The situation is more than a little fevered. Too burdened a sense of responsibility conduces neither to vigour of life nor of action. It may be that the community that would save its life should not take too much thought against losing it. This is not the place to pursue these ideas, and I mention them only because, if valid, they are crucial for the social services.

There will be, as I have said, a much larger number of the aged. It seems to me that we should clear our minds of some of the complacent satisfaction about prolongation of life. There are credits of old age of no mean order; but, on the whole, more of it is good only when it indicates more vigour and activity of life, in the added years or those preceding them.

The one idea that seems now usually to prevail is to pension off the aged. To clear them off the labour market may relieve an industry which is more than temporarily depressed, but as a lasting cure it ranks with the plea that the country is over-populated.

The country is confronted with the probability that in about 30 years' time it will have a population (in England and Wales) of some 3½m. persons aged 70 and over, with an added 2½m. or so aged 65 to 69, out of a total population of some 40m. (some say substantially less), as compared with the present under 2m. aged 70 and over and under 1½m. aged 65 to 69 out of a population of approximately 41m. The cost of old-age pensions, in 1935–36 £38½m. for ages 70 and over and £17½m. for ages 65 to 69, may be expected to be about £75m. and £28m. respectively, assuming no change in present rates and conditions.

The principal problem before the country, to my mind, is not the increased cost, heavy though it be, because productive capacity should increase greatly if not dammed by hindrances, but how this great body of the aged can be best occupied, for their own contentment not less than for the general good.

This is partly a question of suitable and sufficient employment of leisure, and much more needs to be done in this respect. But the problem is more than this. It is doubtful whether what is needed can be met without retaining a large proportion of the "younger aged" in their normal or other suitable occupation, for their own advantage as much as for the public benefit, to prevent that subtle canker of deterioration and discontentment so apt to set in when a man is definitely "put on the shelf" and has no other alternative employment. It is not by any means easy to fit them into the present economic system, but this, I suggest, with more opportunities for the definite use of leisure, is the problem of the aged in the coming years even more than pensions.

7. *Administration.*

Costs of administration for the several services are given in the official returns, but the figures are not of much value without extensive examination of what they include and what they do not include, and of the administrative needs of the several services and of efficiency, not only in immediate administration but also in long-range policy. The total number of persons engaged in the social services, public and private, is large, but I know of no figures or sound estimates, though they would be of more than academic interest. I shall here confine consideration to three subjects—co-ordination of the several services; the participation of the consumer; morale.

Co-ordination.—There are a multitude of bodies engaged in the public social services: at the centre, the Ministries of Health, Labour and Pensions, the Board of Education, the Home Office, the Unemployment Assistance Board, the Board of Control, the Board of Customs and Excise and the Post Office (the latter two strange bedfellows with the others, but pressed into the social services for convenience); in the localities, the ordinary Local Authorities (working through committees which at places go their own gait almost as though independent), Insurance Committees, some appellate bodies and a number of advisory committees. In addition, there are the societies and branches for health insurance, and voluntary bodies are as pebbles on the sea-shore.

It has been suggested that there should be one central authority for the social services—a suggestion that mistakes the shadow for the substance. It is far more vital, for instance, that health insurance should be associated with other health measures and unemployment insurance with measures for employment than that the two should be tied together just because they are insurance and "social."

There is more to be said for local integration. It would be well, for instance, if something could be done to reduce the plague of inspectors, visitors and the like which may descend (but in fact not often do descend) on a household in need. But the many classes of officials are the consequence of increased specialization of functions, which itself is a response to larger opportunities of service. We are apt to-day to put too high the waste of overlapping, though that is no reason for not trying to reduce the much that prevails. In existing conditions the most promising line of progress is to develop among the several units of social service, individual and corporate, more knowledge of each other's work and more readiness to make use of each other's facilities.

Some would like to see a commission appointed to consider the general position. The time is far from opportune. A commission has but recently reported on unemployment insurance and assistance, the U.A.B. has only just started work and the country is learning from its infant travails, County and County Borough Councils are still organizing and developing the changes in administration of the social services consequent on the Act of 1929. It does a watch no good to take it to pieces too often, and it is the negation of practical wisdom to scrap measures before they have been tested and their lessons learnt, just because a better way may be round the corner.

And, above all, there is need for more genuine research, as distinct from mere opinions or superficial conclusions or evidence across a table.

The "Consumer."—Health insurance is the one public social service which is supposed to be administered by the consumer (apart from the representative principle in local and central government), and even there this is, with some exceptions, more apparent than real —though with a real in the background. It is typical of the irony of history that Bismarck introduced sickness insurance, among other measures, partly to dish the social democrats, and in the result provided them with one of their best schools of administrative practice, and Mr. Lloyd George introduced a scheme of democratic administration which immediately became bureaucratic, though not governmental bureaucracy.

In some measure the consumer is indirectly brought into the appeal tribunals of unemployment insurance and of unemployment allowances and into advisory committees. The endeavour in the original Act largely to use Trade Unions for administering unemployment insurance was a failure.

Yet for administration and for morale, and also for the future of democracy, we are losing a great deal if we cannot in some way bring the consumer into more effective participation in management. The subject is closely tied with that of morale, and is considered in the next section.

Morale.—There is clear need of some curb on sentimental (perhaps the most dangerous of all), sectional and electoral extravagance in the social services—a fact amply demonstrated in history, including our own of recent years. One of the most interesting of recent inventions in government is the provision in the Unemployment Insurance Act of 1934 for the appointment of a Statutory Committee with the duty of periodically considering the financial position of the insurance fund and of presenting reports which must be placed before Parliament, with an obligation on Governments to declare what they propose to do on the reports and, if recommendations are not accepted, the reasons.

This is a principle which admits of wide extension. It accords with what has been required from the outset in health insurance, where the principle can be much more readily applied, of periodical actuarial reports, with an obligation to make deficits good. In contributory pensions also a periodical report is required, at intervals of 10 years, but the Government are not expressly obliged to take any action on it; I refer elsewhere to the significance of the first report, made in 1937. The temptation to largesse is so great, even when men want to be virtuous, that some definite means are highly desirable, not to control Government and Parliament—that would create an impossible position—but to make them think twice before taking action declared by competent authority to be ill-advised and with facts clearly and publicly disclosed.

For general maintenance of morale, as well as for training in self-government, there were (and to some extent still are) very valuable elements in, for instance, the old Friendly Societies and in the administration of benefits by Trade Unions, despite their shortcomings, elements which a democracy can ill afford to lose, and in general on bureaucratic organization can hope to be as strict in administering benefits as a body of the insured, provided always—and here is the rub—that there is an adequate sense of financial responsibility.

8. *Prevention.*

Health.—The relative merits, where means are limited, of expenditure on prevention or on cure is always an issue. In health, for instance, the remarkable results already achieved suggest that concentration on prevention, with the necessary research, would probably yield much the larger return. But the present generation has to be considered, its needs alleviated and its afflictions lightened, and a balance has to be struck between the present and the future.

For the present and the future, however, and in the interests of administration no less than of health, more investigation and research into insurance sickness seem desirable. There have been disquieting increases (particulars are given later), and though much of this may be because the insured have become more " treatment-conscious," to use modern slang, some of it is due to malingering, probably substantial in the aggregate but not proportionately, and possibly still more to valetudinarianism, far more insidious and dangerous than deliberate malingering because unconsciously weakening the will to resistance of disease. The present administration of health insurance, admirable as it is from the static standpoint, needs to be more dynamic.

Provision of Work.—It is of measures for preventing or reducing unemployment that most has been heard in recent years, and optimistic hopes have been held out of what is possible by monetary control and by regulating the flow of public and semi-public works according to the barometer of unemployment.

In the past, relief by provision of work has been more often bad than good, though there have been notable exceptions. The work done has not usually been deliberately postponed for a needy future but has anticipated the future—it has, indeed, been an express provision of grant that this was so—and whatever may be said for such a policy when recovery is just round the corner, it is manifest folly when recovery is so long delayed that more and more of the future has to be robbed of its normal quota of work.

In addition, unemployment work, the relief stroke, can be more demoralizing than straight relief, properly administered. If works are put in hand for relieving unemployment, they should be done as nearly as possible under ordinary contract conditions.

While more can be done by postponing works, the advocates of the policy are apt grossly to over-state the extent. One might almost imagine at times that advantageous schemes of work grow like berries on hedgerows. Necessary schemes of public works cannot be so readily postponed as is often fondly supposed, and, while at times much may be justified for moral effect, the total of employment which can be advantageously provided is likely to be proportionately small, as is indicated by the experience since 1921, unless large new schemes of development are put in hand, and those usually advocated are too often of nebulous promise.

At the same time, there is room for a thorough reconsideration of the whole question in the light of the heavy financial responsibility which now falls on public funds in times of severe unemployment, but in a realistic spirit and in times of prosperity, not of depression.

Maintenance of Purchasing Power.—The social services are themselves preventive in important measure, by saving body and mind from deterioration (if properly administered, that is; if not, they can do much harm) and by reducing the spread of economic depression. The latter is most marked in unemployment insurance, where funds are accumulated in good days to provide for those of need; but prevails also in health insurance and in contributory pensions by maintaining these sources of income regardless of economic conditions.

The effect is different in those services for which money is raised as it is needed. In these cases, money is transferred from one pocket, that of the tax- and rate-payer, to another, that of the recipient of service; there is therefore no increase in the means of spending, though effective spending may be increased by reduced savings. But there is more spending on goods of primary necessity because of the services, and probably less disturbance in the balance of demand for commodities and in the industrial structure. It should be considered whether, even in these services, means could not be devised for accumulating funds in good times; but they should be funds which cannot be raided—of which there would be a danger—as by accelerating repayment of debt in prosperity and reducing it in depression.

The aggregate effect of the social services in this respect must be great, considering that the total expenditure on them in Great Britain now exceeds £500m., compared with a national income of some £4,000m. Some would say, indeed, that they saved the recent depression from becoming calamitous. Despite the redistribution of means effected by the social services, however, and despite the much larger share of the national economic demand now derived from public and semi-public bodies with their relative steadiness, the depression was deep and, even allowing for its special causes and for the fact that for unemployment insurance, so called, we lived largely by contemporary taxation and by mortgaging the future, there is still much to be learnt.

PART II.

This part of my paper is devoted to a more detailed investigation of the several maintenance services. They are services which formerly had generally to be sought from the poor law or from private philanthropy, so far as those needing them could not provide them from their own resources or with the help of relatives or friends or from benefit societies.

1. *Unemployment.*

General Survey.—Unemployment has a long history in this country, and we might have handled its recent problems more wisely if some of the abundant energy spent in telling governments what they ought to do had been expended in more understanding of that history and in making it better known. The problems have not been so new or the confident remedies so original as is often supposed.

Until the present century the principal public stand-by of the needy without employment was the poor law. In practice, the help of relatives and friends and private philanthropy was more important, in addition to the assistance afforded by the Trade Unions. In times of heavy unemployment much was done in the aggregate in finding (or making) work. The Unemployed Workmen Act of 1905 was significant—not for what it achieved; that was almost ridiculous —but for what it portended as an attempt to deal with the unemployed as a special problem, though in that case as a joint venture with private philanthropy.

National Labour (now Employment) Exchanges were established in 1909, and in 1911 compulsory unemployment insurance was introduced, for a few selected industries with some 2¼m. workers and with a benefit rate of 7*s*. a week, limited to 1 week for every 5 contributions and a maximum of 15 weeks in a year, and with concessions to employers for regularly employed workers and to the insured, at age 60, for large credits in contributions. The scheme was extended during the war, prospered with the flush of work, and at its close had the comforting surplus of £15m. It gained, too, by the "out-of-work donations," of over £60m., made by the State to ease the transition from war to peace. And after the war, nearly everybody bubbling with confidence, benefits were increased and insurance extended to nearly all manual workers, except those in agriculture and domestic service, and to other employed persons earning not more than £250 a year. In 1921 the number insured in Great Britain was just over 11m., as against a little over 15m. in health insurance.

The story since the war is recounted in the report, of 1932, of the Royal Commission and in the dry, but not less instructive, pages of the *Labour Gazette.* It is a story of bewilderment, of drift, of failure to recognize the special nature of the problem, of hopes of recovery dashed by fresh depressions, of frantic efforts to find some way of increasing employment, and finally of a crash, of remedies which showed that the democracy of Britain has a strain of heroism for peace as well as for war, and a notable and deserved recovery.

The story is told in figures in the third table of the appendix. From November 1920 to March 1936, nearly £1,000m. was paid out in unemployment benefit and in uninsured payments to the unemployed under various designations, the last being unemployment allowances—designations which would serve as a better peg than most for a treatise on the gradual approach to reality! In the two years of highest expenditure, 1931–33, £215m. was paid out; and the unemployment fund accumulated a deficit of £115m., reduced to just under £106m. when, from July 1934, the debt was funded and arrangements were made for its gradual repayment.

Nor is this all. Account must be taken of several other expenditures from public funds to help the unemployed—works put in hand by Local Authorities and others, with State aid, to relieve unemployment; poor relief; concessions, from State funds, to keep the unemployed within health insurance and contributory pensions; exceptional measures for the Special Areas; and others, such as transference and training. The total would be a stupendous figure.

It is not an exhilarating story—rather like that of a lion caught in a trap and licking his wounds in the meantime—but no country has done better in so grave an emergency and, considering some of the ways of salvation pressed on governments, there is more cause for gratitude than for censure.

We have now reached the stage, first, of unemployment insurance limited to available funds and with measures for securing that the scheme is kept within its intentions (and latterly extended to agriculture by a special scheme), and, second, provision at State cost for maintaining the unemployed not entitled to benefit, according to their needs.

Analysis of Unemployment.—I shall restrict myself here to a few general observations which, though made before, need to be repeated. In the unemployment of recent years the "secular" changes have been more important than the cyclical. The hothouse of the war and its aftermath crammed into a few years changes which would otherwise have been spread over thirty or more, and produced some special poisons of its own, notably that of national self-sufficiency. Much nonsense has been written of technological changes, as though they were some new cosmic rays; but these have been relatively less than those of some hundred years ago.

We have been, and still are, under the necessity of finding a new balance of our working population. It is not that the population is too large, but that the distribution between industries has to be altered—which, of course, is no new necessity: readjustment of this kind is an essential of industrial health, though too much of it at a time produces disease. If the wild statements which have been made about the drift of industry southwards were true, we should but be going the full round of the wheel and reversing the process which took place over a century ago. In fact, the drift has been negligible (the Board of Trade return for 1935 showed five transfers of factories from south to north and only one from north to south!); the large expansion in the south has been due to economic conditions and the changing face of industry. The principal Department which should be concerned with preventing and reducing unemployment so far as this can be done is the Board of Trade, not the Ministry of Labour, and the best "social service" which can be rendered in this sphere is so far as possible to ascertain and to understand trends and to help provide for them.

Comparing persons engaged (including unemployed as well as employed) in the main industrial groups in June 1923 and in June 1936, the largest proportionate increases occurred in the miscellaneous services (a large group, including hotel, boarding-house etc. service; professional service; laundries, dyeing and dry cleaning; and entertainments and sports), with a rise of 70 per cent.; in building and public-works contracting, with 63 per cent.; and in transport and distribution, with 47 per cent. Coal-mining and quarrying, on the other hand, were down by over 23 per cent.

Duration of Unemployment.—Most of the unemployed are "temporaries," suffering only for short periods, but there is a long-period core. The Royal Commission classified workmen as follows (p. 77 of report) :—

1. Those who escape unemployment altogether, from ⅓rd to ⅖ths of the total.
2. Those unemployed only in a bad year or through some misfortune of their employer, the proportion being indicated by the fact that 3 out of 7 applicants for benefit in the years 1923–30 made no claims in 6 of the 8 years.
3. Those—a large class—suffering considerably from unemployment in bad years or declining industries. In good years and stable industries they are not distinguishable from class 2.
4. Those with unemployment so frequent and so long that it exceeds a third of their working time.
5. Those, a small class, more or less continuously unemployed.

This is not intended, of course, as more than a broad picture, and many questions would have to be answered before the problem can be understood, and it will be pertinent here to deal with only a few of them.

Among striking statistics in the report of the Royal Commission are a set which analyse, from a sample, the total persons insured in Great Britain in July 1930 according to the number of days of benefit received from October 1923 to December 1930, a period with a possible 2,259 days of benefit (pp. 72 ff.).

Days of Benefit Drawn.	Percentage of Total Insured.	
Nil	44·2	78·7
1–100	23·9	
101–200	10·6	
201–300	6·6	
301–400	4·3	
401–500	2·9	
501–700	3·6	
701–900	2·0	
901 and over	1·9	
	100·0	

What is noteworthy from this table is—the large proportion who drew no benefit; the very large proportion, nearly 80 per cent., who drew less than a tenth of the possible maximum; the small proportion who drew benefit for more than a third of the maximum.

A wealth of statistics is published in the *Labour Gazette*, perhaps too much, or similar figures at too short intervals, possibly with less public attention in consequence. Incidentally, also, how much longer is the *Gazette* to produce its figures and comments in print which is an offence to eyesight, and scarcely creditable for a Governmental production?

In the issue for January of this year it is estimated that of the men and women applicants on the register of unemployed at any one date in the years 1932–35—

more than ½ found employment within the ensuing 3 months
about ⅔ ,, ,, ,, ,, ,, 6 ,,
about ¾ ,, ,, ,, ,, ,, 9 ,,
about ⅘ ,, ,, ,, ,, ,, 12 ,,

In the year 1936 about 4·2m. unemployed had claims; the average number with claims current on any one day was about 1·5m.

The same issue gives figures (for the 8th June, 1936) for each industry with at least 10,000 applicants for benefit or allowances. Of men unemployed for 12 months or more in all these industries or services nearly a quarter were in coal-mining and an eighth in public-works contracting, which has a large fringe of intermittently employed. Of the applicants in coal-mining (224,000) over a third had been unemployed for 12 months or more, and in public-works contracting nearly a half.

How large is the semi-permanent core of the unemployed? Figures already given provide some indication, and further information is contained in a table (p. 303) in the report of the Unemployment Assistance Board issued last year, which shows that of the 720,000 persons receiving unemployment allowances on May 27, 1935—

> No less than 140,000 (20 per cent.) had had a last spell of unemployment of 3 years or more. Between 3 per cent. and 4 per cent. had had a last spell of over 5 years.
>
> A further 11 per cent. had been unemployed for 2 years or more; and
>
> A further 17 per cent. for one year or more:
>
> Not far short of a half had been unemployed for one year or more.
>
> (In these figures spells of employment of not more than three days are ignored.)

A total of 140,000 persons with little or no employment for a continuous period of at least 3 years presents a serious problem. Information is not given of the ages or occupations of the 140,000, but the general position is indicated by figures, published in the *Labour Gazette* for October 1935, of an enquiry made towards the end of July of that year. The enquiry revealed—nearly 381,000 applicants for benefit or allowances who had been on the register for a year or more, nearly 149,000 for 3 years or more; of the 149,000, over 42,000 belonged to coal-mining, over 20,000 to public-works contracting; nearly 46,000 were between the ages of 55 and 65.

Another interesting classification of the unemployed is given on page 76 and following pages of the Board's report.

The U.A.B. has obviously a hard task in dealing with an intractable total, a substantial figure even though now reduced by better trade, of persons who are never likely again to be regularly employed in their old trades or districts. And the foregoing figures do not include the able-bodied who are to be transferred to the Board from the Public Assistance Authorities, and most of these will probably have been long unemployed. The Board have power to refuse allowances, subject to a right of appeal, to persons not capable of or available for work, and some pretty squabbles may later be expected between them and the Public Assistance Authorities—but not just yet, because the Board, with recent troubles in mind, may be expected, like Agag, to walk warily for the present. But the efficiency of the Board's work may in the long run depend much on the vigorous, though careful, exercise of these powers, and a strong backing of public opinion needs to be developed for this purpose. What is wanted is some approach to that hard sense of reality shown by Trade Unions when administering their own funds.

There has been, and still is, much controversy whether it was wise to establish a special body for dealing with the unemployed. There is exaggeration on both sides. The U.A.B. might possibly never have been necessary had it been practicable to supersede some Local Authorities—only a few—who were flagrantly breaking the regulations and who were themselves probably surprised at being left in power. In the prevailing conditions, a central body was probably inevitable—and, of course, there are some functions, such as transference and training, which must be, or are better, centrally administered. It is a phase through which we had to pass; but the Board will probably meet the fate of the Poor Law Commissioners, possibly after an even shorter life.

Unemployment by Industries.—The following figures from the report of the Royal Commission (p. 82) state the average number of days' benefit drawn during the period 1921–31 per insured man in the several industries and illustrate the marked difference in incidence :—

	Days.
Shipbuilding and repairing	527
Iron and steel	400
Dock, harbour, river and canal service	358
Public-works contracting	350
Coal-mining	227
Distributive trades	87
Printing, publishing, bookbinding	67
All industries and services	182

The figures for women are almost equally striking.

Another set of figures shows the average unemployment from January 1927 to December 1931 in industries with high unemployment (p. 83). The average for all industries was 13·6 per cent.; 16 industries are given with percentages ranging from 17·4 to 32·8. It is stated that the difference between the average and the percentages for industries with high unemployment accounts for nearly 300,000 unemployed persons.

The foregoing figures may be compared with those published in the 1936 issue of the *Statistical Abstract* of the percentage of insured persons recorded as unemployed in the several industries (including "services") at the end of January and of July in a number of years. In 1935 the average of the two dates exceeded 20 per cent. in 24 industries; the highest was in public-works contracting (with over 47 per cent.), ship-building and -repairing, jute, tin plates and dock etc. service; the percentage was under 10 in 21 industries, each with a relatively small number of employees, though large in the aggregate; the percentage for all industries was 16·4.

The large differences shown by these figures emphasize that a uniform scheme of insurance can be equitably applied to only a limited extent and with large outside assistance. Further, that the more the burden of unemployment is borne by common provision, whether of insurance or of State provision, the more is the danger that little endeavour will be made within industries to reduce the fringe of workers liable to unemployment, and the more necessary are deliberate measures from outside to that end.

With the general revival of trade, some of it stimulated by the re-armament programme, it is becoming increasingly manifest that the unemployment in coal-mining is the crux of our problem, and that this cannot be remedied without still more transference. There is a growing realism, unpleasant though it be, in surveys of the position, as manifested in the report by Sir Alexander Gibb and Partners on South-West Durham and the recent survey of South Wales, with its estimate of 80,000 surplus workers. The boom in trade provides an opportunity for more transfer of labour and is already manifested in figures, the total transfers under the industrial transference scheme having risen from 16,400 in 1934 and 29,800 in 1935 to 42,700 in 1936. There is room for much more, given more willingness to be transferred.

Personal Disqualifications.—The Royal Commission gives particulars of a sample enquiry made in February 1931 to test the qualifications of unemployed persons (pp. 79 ff.) The test was rough, being the opinion of the Employment Exchange officials, helped by records. The main conclusions are briefly these—

1. The proportions considered unsuitable for submission for a local vacancy were—men, 1 in 4; women, 1 in 5. These proportions indicate that, of the total then unemployed, about 470,000 men and 120,000 women were unsuitable in some way.
2. The percentages unsuitable on personal grounds were, for men and women respectively—16·5, 13·3; on industrial grounds—5·0, 4·0; on both grounds—3·4, 2·8.
3. Advanced age was the principal personal disqualification, more than half the men over 60 years of age being judged disqualified on this ground. Defective physique came next.
4. The rate of unemployment is much higher for ages over 44, being, for men, 21·2 per cent. for ages 18 to 44 (but with a high rate for ages 21 to 24) and 27·8 for ages 45 to 64.

These figures cannot be taken as more than indications. An Exchange official, despite his experience and opportunities, cannot usually be expected to judge those qualities of temper, readiness, ability to get on with his fellows and the like which are so important for employability. Also the standard is, of course, very different for prosperity and for depression, for a progressive industry and one that is receding.

Of men unemployed on November 2, 1936, all but 9·5 per cent. were in the ages 18 to 59, over 60 per cent. being in ages 18 to 44. Men of 55 years of age and over formed just over 20 per cent. of the total, of whom only 0·3 per cent. were 65 or more (*Labour Gazette*, December 1936).

Provision of Work.—The story of the public social services for unemployment would not be complete without mention of measures for the provision of work and for the Special Areas. I will deal with both very briefly.

Local Authorities in particular were pressed to put in hand new works, works which anticipated the future, and were stimulated by liberal grants, which varied at different times and for different classes of work, the highest being equivalent to over 60 per cent. of the capital cost of works, except that on one occasion the full cost of works was paid in a number of selected areas exceptionally depressed. Grants were also paid for works undertaken by public utility undertakings, and other measures were adopted to stimulate more employment.

The grants to Local Authorities were distributed through the Unemployment Grants Committee, which functioned from December 1920 to August 1932. The following is a summary of what was done :

> Nearly 18,000 schemes were sanctioned for grant, with an estimated total value of £191m.
>
> Grants were freely given from 1921 to 1925. From 1925 to 1928 conditions were tightened and few schemes approved. From the middle of 1928 grants were again freely given (from September 1929 to December 1931 schemes to a value of £77m. were approved). From September 1931 grants were reduced, under the economy measures, and no new schemes were approved after January 1932.
>
> Of the £191m., £113m. was for non-revenue-producing schemes (the most important being sewers and sewage-disposal works) and £78m. for revenue-producing (the most important being electricity and docks and harbour works).
>
> It was estimated that the total liability on the Exchequer was equal to £67m. on present values, being 35 per cent. of the cost of the schemes as a whole.
>
> The average amount of *direct* employment from each £1m. expended on works was about 2,500 man-years.

The above grants were independent of those from the Road Fund, which amounted to a large total, and special grants made by the Ministry of Agriculture, particularly for drainage works.

Special Areas.—As was to be expected, the only substantial volume of local employment directly afforded through the activities of the Commissioners for these areas has been by renewing for the areas the practice of assisting unemployment works, condemned and abandoned (before the revival in trade) for the country as a whole. The most spectacular and lasting of the measures taken by the former Commissioner for England and Wales has been that for establishing groups of families (of about 40) in small holdings; it is a project towards which Sir Malcolm Stewart has himself liberally contributed, and he aimed at establishing about 2,000 families by the summer of this year. Group holdings of about a quarter or a half of an acre have also been promoted for part-time employment and help given to "subsistence production" schemes.

The most useful permanent measure may well be the establishing of trading estates. The Government have been induced to venture more and, through the Special Areas Reconstruction Company, with some financial aid from the Exchequer, financial facilities have been made available for those ready to promote new ventures with reasonable prospects of success, and it is now proposed that they be further aided by grants towards rates and taxes and rent.

The financial commitments of the Commissioners were some £9m. for England and Wales and some £2m. for Scotland, up to the end of January last, for various schemes, including works by Local Authorities, agricultural settlements and trading estates.

In his final report, Sir Malcolm Stewart made a series of recommendations, which are a mixed bag. He suggested that the location of industries in Greater London might be restricted; it is unlikely that the Special Areas would be benefited even if this were done. He further suggested that the burden of public assistance should be reduced in the Special Areas, as by equalizing the public-assistance rate throughout the country: there is probably a case for some relief, even with the increased block grants which will be provided under the proposals of the Government, but this is certainly not the way to do it.

Much excellent social work in the Areas has been stimulated and helped by the Commissioner, who has worked in this matter chiefly through the National Council for Social Service. The Ministry of Labour have been active in transferring labour, with more success since the revival of trade, and in training persons at special centres and reconditioning others in instructional centres and, most beneficial of all for the moment, Government orders have been directed to the Special Areas, to a total of £35m. by the end of January last (now much more). The reports of the Commissioner showed a reduction in the registered unemployed in the Special Areas of England and Wales from 348,000 in November 1924 to 283,000 in September 1936, but largely due to transference of labour.

2. *National Health Insurance.*

All manual workers and also other persons employed under a contract of service and earning not more than £250 a year are compulsorily insured, with some exceptions. The total insured in England and Wales in 1935 was 16·6m., two-thirds being males.

The present ordinary rates of contribution are 9*d.* a week for men, payable in equal shares by employer and employee, and 8½*d.* for women. 4½*d.* by employer and 4*d.* by employee. The rates for young persons are lower. The State contributes towards the cost of benefits and administration, one-seventh for men and one-fifth for women.

The ordinary benefits are—(1) medical attendance and treatment of a kind reasonably expected from a general practitioner and (within prescribed limits) medical and surgical appliances, but not specialist service or hospital treatment or attendance at confinements; (2) sickness benefit of 15*s*. a week for men and 12*s*. or 10*s*. for women, the latter for married women, from the fourth day of incapacity for not more than 26 weeks within 12 months, provided the necessary number of contributions have been paid or excused; (3) disablement benefit of 7*s*. 6*d*. a week for men and 6*s*. or 5*s*. for women, the latter for married women, who have exhausted their claim to sickness benefit and continue incapacitated, the claim continuing, with incapacity, to age 65, when that to an old age pension normally accrues; (4) maternity benefit on confinement, ordinarily of 40*s*. An account is given later of additional benefits.

This is just a broad outline of the scheme, and much else would be needed to state its provisions in any detail. A person who reaches the age of 65 and becomes entitled to an old age pension is no longer required to pay health contributions, but his employer must continue to pay his own share, and the insured remains entitled for life to medical benefit, but not to others.

The following summarizes briefly the principal statistics of health insurance in England and Wales for the year 1935—

Number insured: 16·6m. (12·1m. in 1914).
Receipts: Total of nearly £36m. (£20·4m. in 1914).
  Nearly two-thirds from contributions and one-sixth from Parliamentary votes.
Benefits: Total cost, nearly £28m. (nearly £13m. in 1914).
  About one-third each paid in medical and in sickness benefit, about another one-fifth in disablement benefit, just over one-twentieth in maternity benefit and nearly one-thirteenth in additional benefits.
Cost of administration: About £5m. (£2·6m. in 1914).
  Being about 18 per cent. of total expenditure on benefits. About four-fifths was for societies and (a small sum) for Insurance Committees, and the rest for central administration.
Accumulated funds: £119m. at the end of 1935.

The scheme is under the general supervision of the Ministry of Health in England, the Welsh Board of Health in Wales and the Department of Health in Scotland. The administration is carried out mainly by Approved Societies and, for medical benefit, Insurance Committees.

As already stated, these societies are supposed to be managed by their members, but, in effect, most of them are managed by a "bureaucracy" of persons appointed, directly or indirectly, by the societies. The system of Approved Societies is one to be retained, despite criticisms which may be made. The Royal Commission recommended retention in their report of 1926. Not the least of the advantages of the system is that it breeds a body of men outside government, versed in administrative experience, who are a breakwater against the storms of rash demands certain to arise from time to time.

Medical benefit is administered by the Insurance Committees, composed of representatives of the insured, the Local Authorities and the medical profession. They have little of importance to do, the Royal Commission recommended their abolition, and it seems a pity that the recommendation has not been adopted.

Approved Societies include Friendly Societies, Trade Unions, Societies formed by Industrial Assurance Companies or Collecting Societies and Employers' Provident Funds. There were 728 centralized societies and 25 Affiliated Orders, with over 5,000 branches, operating in England at the end of 1935. Mortality has been high among societies. "In England alone, out of 2,208 which had been granted approval, no fewer than 1,192 had ceased to administer the Act by 1923" (Royal Commission Report, p. 94).

As the above figures of present societies show, the process has continued. In the report of the Ministry of Health for 1935–36 it is stated: "In certain cases, where it appears to the Department that the position cannot be improved by changes in the society's administration, the members are invited to consider whether in their own interests they should transfer the engagements of the society to a larger and stronger society. During the year 14 societies decided to adopt this course" (p. 188)—a very nice way of putting it!

Central supervision, coupled with the quinquennial valuations by valuers appointed by the Treasury, is close: "During the last five years detailed enquiries have been made into the administration of 470 centralized societies" (Ministry's Report, p. 188).

Two marked features of the society system are the differences in membership and the dispersion of members. A large membership makes for security. It was originally proposed that for approval a society should have at least 10,000 members, but this was dropped. "The membership . . . varies from less than 50 to more than 2m. In England there are 70 societies with less than 100 members . . . 65 per cent. of the . . . societies . . . comprise only 2 per cent. of the . . . insured persons, while 2½ per cent. . . . include 76 per cent." (Royal Commission Report, pp. 55–6). The conditions have not fundamentally changed, though there are fewer small societies.

The territorial dispersion of members reaches absurd lengths. The Royal Commission stated that in Liverpool there were 488 societies with members, in Brighton 304, Bolton 285, and so on. A witness said that at Dundee there were 217 societies (ignoring branches), 99 of them with less than 10 members, 52 with but 1 (p. 96). The societies would do well for their own future to devise means of co-operation where membership is minutely dispersed, and power might also be given to the central authority to take expedient measures where necessary.

It is over the issue of additional benefits that the Approved Society system is probably most questioned. A disposable surplus certified after a valuation may be used for giving one or more of certain prescribed additional benefits. The following sets out briefly the position in 1936 for additional benefits in England: further particulars are given in the appendix (Table V) :—

> Societies with 13·4m. members (out of a total insured of 15·6m.) gave additional benefits.
>
> Nearly 80 per cent. of the members were entitled to cash and treatment additional benefits, some 20 per cent. to treatment only, and a small proportion only to cash. (Additional benefits can be obtained only after membership of 2 years for treatment and 4 for cash.)
>
> The average increase in cash benefits, where provided, is just under 3*s*. 6*d*. to sickness benefit, 1*s*. 9*d*. to disablement benefit, and 7*s*. to maternity benefit. Societies and branches with nearly 1·4m. members provided 5*s*. a week; with over 3·3m. members 3*s*.; others less : in each case there were corresponding increases in disablement and maternity benefits.
>
> Over £3m. was allotted in 1936 to additional treatment benefits—over £2m. for dental; over £500,000 for ophthalmic; with convalescent-home treatment and medical and surgical appliances next in expenditure. Only just over £90,000 was allotted for hospital treatment and under £30,000 for voluntary donations to hospital and other charitable institutions.

The results of the fourth valuation, completed for 96 per cent. of the membership in England, showed a disposable surplus of over £16m.; societies and branches with a membership of 1½m. (a small proportion of the total) had no disposable surplus. There is no provision for reducing financial inequalities of societies (not a lack necessarily to be condemned) except that deficiencies not due to maladministration which cannot be provided out of a society's own Contingencies Fund can be paid out of a Central Fund provided for this purpose by a general levy.

The insurance scheme provided a special "deposit contributors'" section, with reduced benefits, for those who did not desire or were unable to join an Approved Society. This section has never had a proportionately large membership, even though benefits can now be obtained on the lines of those provided by societies. Whatever was expected, "deposit contributors" have not in fact been a class of bad-health lives. Certain societies have offered to take over the whole class and some have urged their allocation among societies.

I have mentioned the desirability of more investigation of sickness experience. There is a marked contrast between the abundance of investigation and information on the unemployed and the comparative paucity on the sick and the disabled. The contrast is attributable largely to the different systems; the scattered membership of Approved Societies presents difficulties. The reports made by the Government Actuary are admirable, but much more is to be desired. Scotland, with its much smaller range, is making investigations into the incidence of sickness, and it is likely that thorough investigation and research throughout Britain would be well repaid in prevention and treatment and in administration.

Medical Benefit.—£9·4m. was spent on medical benefit in 1935 in England and Wales, out of £27·8m. on all benefits. Of the £8·9m. spent in England, £6·5m. was paid to insurance medical practitioners, with nearly £½m. more for mileage to doctors in rural areas, for medicines and appliances supplied by doctors in special circumstances and for other medical treatment. A small but interesting item is the sum of £7,000 set aside to assist country doctors to attend post-graduate courses, to provide facilities desirable for their service and to establish and maintain practices which would not provide a competence without help.

Over £1·9m. was paid to insurance chemists for drugs and appliances, supplied at about 12,000 shops. England and Wales suffers badly from the "bottle habit" in drugs, in marked contrast with Scotland, whatever be the case with bottles of more cheering contents. In twelve years the number of prescriptions in England and Wales increased from 38m. to 62m. and the cost from £1·3m. to £2·1m., and the position is being examined by the Ministry in conjunction with the British Medical Association. It is stated, however, in the Ministry's report for 1935–36 that "the number of cases in which it has been found necessary to withhold money from doctors on account of excessive prescribing continues to be low . . ." (p. 196).

Complaints are heard from time to time of the medical service, but not many are substantiated. The fair comparison is with the service which would have been rendered had there been no insurance scheme, not with some ideal in a world of utopian perfection, and there can be little doubt that present service is much better, though there is, of course, plenty of room for improvement. The particulars which are furnished annually by the Ministry of Health show that the number of formal complaints is small in proportion to the number of medical practitioners. Two testimonies to the quality of the medical service may also be mentioned—that of the Royal Commission, who refer to "the absence of any substantial volume of criticism" apart from the statutory limitation of its scope, and "the wide demand for its extension" (p. 33); and that by the Chief Medical Officer of the Ministry of Health in his annual report issued in 1936, where he refers to the "ample positive testimony from competent observers to the success of the Insurance Medical Service" (p. 72).

Sickness and Disablement Claims.—The growth of these claims is disquieting. The latest detailed investigation, by now unfortunately old, is contained in a report of 1930 by the late Government Actuary, Sir Alfred Watson, on an "Examination of the Sickness and Disablement Experience in a group of Societies in the period 1921–27" (Cmd. 3548). There were previous reports for the Royal Commission. I must confine myself to stating a few of the salient facts.

The percentage of weeks of benefit had risen in 1927 compared with 1921—for sickness by 41 per cent., 60 per cent. and 106 per cent. for men, unmarried women (including widows) and married women respectively; and for disablement by 85 per cent., 100 per cent. and 159 per cent. respectively. The chief cause was the increase in claimants: there was not much change in the duration of benefit. The number of claimants increased as follows: the first figure is the number per 100 in 1921 and the second in 1927—for sickness, 14 and 23, 12 and 21, 19 and 38 for men, unmarried women and married women respectively; for disablement (per 1,000, not 100 members), 15 and 26, 19 and 39, 33 and 92 respectively. The increase occurred at all ages, and was most pronounced in claims of short duration.

"The general position as to married women is very striking. . . . Of every thousand . . . 430 drew either sickness benefit or disablement benefit or both in 1927" (p. 8). "... a high proportion of 'recoveries' after entry on disablement benefit [with reduction of cash benefit] is common to both sexes and to all ages." "Of all claimants who passed from sickness benefit to disablement benefit in 1927 and ceased to draw benefit before the end of the year, more than 1 in 6 went off the funds immediately the benefit was reduced to the disablement rate. Within a month . . . 50 per cent. had been certified as capable of work, and within 8 weeks 70 per cent. had found their working capacity restored" (p. 15).

I have commented on these facts in the opening part of my paper. After an extensive enquiry among societies, the Ministry of Health reported (Annual Report, 1929–30, p. 199): "... the main contributing causes ... during recent years are stated by a majority to be epidemics and unemployment. Other factors cited are lenient medical certification, inadequate sick visiting, insufficient scrutiny of claims, unhealthy occupations, low vitality due to poverty or bad environment, insufficient use of the regional medical officer service, malingering, indiscriminate admission of members, ineffective control by committees of management, and over-insurance"—a comprehensive list which does not carry us much farther. Administrative measures were taken, and also from the 1st January, 1933, sickness benefit for married women was reduced from 12*s.* to 10*s.* a week and disablement benefit from 7*s.* 6*d.* to 6*s.* for single women and widows and 5*s.* for married women, but there is no information of substantial change.

3. *Contributory Pensions.*

Contributory pensions were introduced in 1925. The classes of persons insured are broadly the same as for health insurance. The ordinary rates of contribution are now 11*d.* per week for men, half paid by employee and half by employer, and 5½*d.* for women, 2½*d.* by employee and 3*d.* by employer. Up to the end of 1935 the rates were 9*d.* and 4½*d.* respectively.

The benefits are: (1) a pension of 10*s.* a week for the widow of an insured man; (2) on the death of an insured father, allowances for children under age 14 (16, or a little more, if the child continues at school) of—if the mother is alive, 5*s.* a week for the first child and 3*s.* for each other child; if the mother is dead, 7*s.* 6*d.* for each child; (3) a pension to the insured person, and to the wife of an insured man, of 10*s.* a week at ages 65 to 70; (4) a pension at age 70 to these persons at the full rate of 10*s.* a week, without deduction for means. A widow loses her pension on re-marriage, but the children's allowances continue. She also loses her pension at age 70, but becomes entitled to a full old-age pension of 10*s.* a week. The wife of an insured man, unless herself insured, is not entitled to the pension at age 65 unless and until her husband has become entitled.

The scheme is centrally administered, by the Ministry of Health and, in Scotland, the Department of Health. The finances of health insurance and contributory pensions are distinct.

At the end of 1935 there were nearly 17m. persons insured for contributory pensions in England and Wales; and over 2½m. beneficiaries (in a population of some 40½m. persons), including those aged 70 who were receiving pensions in full by virtue of their insurance. The beneficiaries included over 670,000 widows, nearly 280,000 children, over 690,000 pensioners at ages 65 to 70 and over 890,000 pensioners aged 70 or over. The pensioners, including widows, comprised some 870,000 men and nearly 1,400,000 women.

The total received in contributions in the year 1935–36, excluding exchequer grants, was £23m. The total expenditure reached nearly £40m., excluding that on old age pensions at ages 70 and over which was met wholly by the Exchequer. The largest items of expenditure were for widows and for pensions at ages 65 to 70—over £20m. and £17½m. respectively. Payments for orphans came to £300,000. The expenses of administration came to just over £1m., about 3 per cent. of the total paid in benefits; the administration is, of course, a much simpler task than that of health insurance.

The expenditure on widows' pensions increased greatly from the early years, especially in 1931 and 1932, because by an Act of 1929 the then Labour Government admitted to the immediate benefits of the Conservative Act of 1925 additional classes of widows, at a cost, with some other smaller concessions, estimated at the equivalent of a capital sum of £93m. Since 1932–33 the annual expenditure has risen slowly from £19m. to nearly £21m. in 1935–36.

Old age pensions at ages 65 to 70 have also risen much since the earlier years; here also in recent years the increase has been steady, from £15½m. in 1931–32 to £17½m. in 1935–36. The figures will rise with the increased number of the aged. The Government Actuary estimated in a report of 1935 that in 1965–66 the cost would be nearly £28m. for Great Britain, probably a conservative estimate.

The expenditure for orphans has not materially changed, the lowest for any year being £260,000 and the highest just over £320,000. This expenditure should tend downwards, with smaller families and better health.

The contribution of the State is on different lines in contributory pensions from that in health insurance. A fat cheque was drawn on the future for payment of full benefits from the outset of the scheme or soon after. It was estimated that contributions of 10*d.* for men and 5*d.* for women *from age* 16 would have been required for the benefits provided by the Act of 1925 (the rates previously stated were fixed because of relief to the unemployment fund by stopping unemployment benefit at age 65, when old age pensions could be claimed). By accepting entrants at all ages at a flat rate for the same benefits, liabilities were incurred far beyond those met by contributions. It was estimated at the time that the State liability under the Act of 1925 was £650m.

There was no attempt to make the scheme actuarially sound at the outset or to accumulate reserve values, as in health insurance.

Instead, the State has contributed to a Pensions Fund, for England, Wales and Scotland, £4m. for each of the years 1926–27 to 1929–30 (£4m. a year for 10 years was originally contemplated, but the Act of 1929 upset the apple-cart) and £9m. in 1930–31, rising by £1m. each year to £21m. in 1942–43.

Further increases in rates of contribution are contemplated, of 2*d.* a week for men and 1*d.* for women in 1946 and in 1956, when the contributions will be 1*s.* 3*d.* and 7½*d.* respectively. These rates are estimated to be sufficient, *for an entrant at age* 16, to provide for all the benefits up to age 70 and for 62 per cent. of pension at age 70 and over, but many begin to be insured well after age 16.

As previously stated, the Government Actuary is required to submit a decennial report on the operation of the Acts, a valuable provision. The first report, by Sir Alfred Watson, was issued in 1935. It is among the most important of recent administrative documents, but, so far as I am aware, has received scant notice. It is full of information and, for the complexity of the subject, a model of lucidity. "The following statement summarizes the values on March 31, 1934, of liabilities and assets (for Great Britain) in respect of contributors and beneficiaries existing on that date. The added liability in respect of old-age pensions after 70 [estimated at £187m.] is not included. The rate of interest used in discounting the various items down to their values on March 31, 1934, is 3½ per cent. and the assumed rate of unemployment is 14½ per cent" (p. 23 of report) :—

Liabilities.	£m.	Assets.	£m.
Present value of :—		Balance in hand	28
Widows' and orphans' pensions—		Present values of :—	
		Contributions—	
Now in force	181	Present rates	344
Claimable in future ...	534	Decennial increases ...	119
Pensions at ages 65 to 70—		Exchequer contributions as fixed to 1945–46 ...	171
Now in force	42	Balance of Exchequer contributions to be met as Parliament may direct...	764
Claimable in future ...	654		
Future cost of administration	15		
	1,426		1,426

The total liability on the Exchequer as stated above (£171m. + £764m.) is scaled down to £750m. by reason of the higher contributions which in later years become payable by new entrants, if all the contemplated increases are levied, and if "the bulk of those whose compulsory insurance terminates . . . fail to continue as voluntary contributors" (p. 24).

The balance sheet is followed by a forecast of the operations of the scheme to 1965–66, set out in a concise and interesting table from which the following estimates for 1965–66 are taken (the figures in parentheses are the corresponding totals for 1935–36)—Total expenditure, £62·4m. (£39·8m.): receipts from contributions, £37·3m. (£23m.); contribution required from Exchequer for balance, £25·1m.

The report concludes by estimating "the net value of future benefits payable by the Exchequer at £1,150m. on March 31, 1934. If the sums payable by the Exchequer from the beginning of the scheme are included, this sum is brought up to £1,211m." (p. 35).

These are brave figures, even for the most valiant of State-service optimists. Pessimists will ask, Whither are we going? I have previously intimated that there is little doubt that the burden can be borne provided certain conditions are fulfilled.

Since the foregoing was written, the Government have announced their proposals for extending the scheme of contributory pensions, on a voluntary basis, to "black-coated" and other workers with an income, at entrance, of not more than £400 a year for men and £250 a year for women, half of which may be unearned income. The estimated capital cost to the State for the contributory benefits up to age 70 is about £23m. if 350,000 persons avail themselves of this new opportunity to become insured, about £43m. if the number is 700,000.

4. *Public Assistance.*

Expenditure on public assistance is still in some respects the most significant in the public social services. The figures stated later raise some serious questions. Tables of more detailed statistics are given in the appendix.

For many years before the war the trend of pauperism was markedly downwards. Since then it has been notably higher, and shows no tendency materially to fall. This despite the large sums expended on other assistance.

The following figures state the lowest and the highest number of persons relieved per 10,000 of the population in each decade since the year ended March 1850:—

1850–59	444 : 574
1860–69	429 : 530
1870–79	295 : 465
1880–89	283 : 318
1890–99	256 : 273
1900–09	241 : 262
1910–14	203 : 259
1915–19	148 : 203
1920–29	150 : 526 (314) : (423)
1930–36	276 : 372

I have given two sets of figures for 1920–29 because the lowest figure (150) is for 1920–21 when the war afflatus still prevailed, and the highest (526) was in the *annus miserabilis* of the coal and general stoppage.

True that the post-war years have been full of travail, but they have been full also of the giving of public money other than in poor relief.

The expenditure on poor relief shows great increase. This expenditure and that on related purposes per head of population rose from 5*s.* 11*d.* in 1888–89 to 8*s.* 4*d.* in 1908–9, and continued at about the latter figure until 1914. By 1921–22 it had risen to 22*s.* 4*d.*, and from 1923–24 to 1934–35 it only once fell below 19*s.* and (except for the exceptional 1926–27, when it reached 25*s.* 6*d.*) ranged round about 20*s.*, being 21*s.* in 1934–35.

Reduced purchasing power of money accounts for part of the rise, but far from all. The rise is even more significant than it seems, because in the later years a much smaller proportion of the relief is institutional, which is much the more costly (the average cost per person of institutional relief is about 24*s.* the week; of out-relief, about 6*s.*). In recent years also many institutions have been transferred from public assistance to other services.

The difference in the proportion receiving in-relief and out-relief is noteworthy. The number receiving in-relief in proportion to the population is fairly steady, that receiving out-relief fluctuates a great deal.

In 1890 under 70 per cent. of those receiving relief were given out-relief; in 1936 nearly 80 per cent. From 1890 to 1914 the number receiving in-relief ranged from 62 (in 1892) to 78 (in 1910) per 10,000 of the population. From 1921 to 1932 it ranged from 50 (in 1932) to 57 (in 1927). Since 1932 it has been below 50, and reached 42 in 1936, the lowest of recent decades. Some of the reduction is explained by the transfer of institutions, notably hospitals.

On the contrary, out-relief showed a steady fall from 1890 to 1914, from 188 per 10,000 in the former to 105 in the latter. It fell as low as 76 in 1919. Since 1922 the lowest figure has been 193 (in 1931), but in most years it has been well above 200 (it reached 441 in 1926–27) and was 287 in 1935–36.

A surprising fact is the large increase in the number of able-bodied relieved. Exact comparison is difficult because the basis of classification was changed in 1913 for out-relief, and in 1915 for in-relief. Previously separate figures were given for "ordinarily able-bodied," persons over age 16 so classified in the records, and these included persons temporarily disabled by sickness or accident. Since the dates mentioned "ordinarily able-bodied" has been dropped, and the classification is now (for persons over age 16) into those suffering from sickness, accident or bodily or mental infirmity and others. The "others" coincide largely with those previously classed as "ordinarily able-bodied," and there is good reason for assuming that, per 10,000 of the population, the difference in the two is usually not substantial.

Examining the returns, we find these remarkable results. From 1887 to 1912, which included, of course, some periods of serious depression, the number of "ordinarily able-bodied" in receipt of relief on January 1 ranged from a highest of 40 to a lowest of 30 per 10,000 of the population. From 1922 to 1936 the corresponding figures ranged from 63 (in 1931) to 128 (in 1922 and 1923), being 100 or more in 10 of the 15 years.

The explanation of these figures lies, I think, principally in the fact that relief is now more freely sought and more freely given, though the exhaustion of means and of help from relations and friends because of continued depression has played a part. It has to be borne in mind, however, that in some areas in recent years small sums have been paid in supplement of unemployment benefit or other payments, or coal given during the winter, and the number receiving relief thus swollen. But comfort from this source is qualified by the figures of expenditure.

Since 1926–27 a new classification has been provided of persons receiving out-relief, recipients being divided into those ordinarily engaged in some regular occupation and others, and the former again divided into those insured against unemployment, those uninsured but registered at an Employment Exchange and others. Statistics for the several classes are given in Table XI of the appendix.

The unemployed persons themselves form a small proportion of the relieved. Those registered at an Employment Exchange (including the insured) constituted in 1936 only 30 out of a total of 295 per 10,000 of the population. Including dependants, those ordinarily engaged in some regular occupation accounted for 136 out of the 295; and, although exact figures are not available, it is known that most of those not registered at an Exchange (probably some 90 per cent.) were relieved on account of sickness, their own or that of a dependant.

At one time it was thought in some quarters that some of the reduction in the registered unemployed was because they were being pushed on to the poor law. This was mistaken, because an unemployed man who reported at an Exchange continued to be counted though receiving relief and, as already stated, most of the relief was on account of sickness.

The differences in the number relieved in the several areas are large, and not by any means wholly to be attributed to local economic conditions. Uniformity in administration is not to be expected, and its want, within limits, by no means wholly to be deplored. But there have been some places, a few, where it would probably have been salutary if the public assistance authority could have been superseded.

The average number of persons receiving relief in England and Wales in June 1936 was 305 per 10,000 of the population. In the administrative counties the figure ranged from under 150 in 15 counties—the lowest being Bedford with 100, West Sussex with 101 and Surrey with 108—to over 400 in 5 counties—the highest being Durham (724), Glamorgan (679), Monmouth (566), Anglesey (436) and Brecknock (422).

In the county boroughs the figures ranged from under 200 in 16 towns—the lowest being Oxford (81), Blackpool (98), Halifax (109), Coventry (117)—to over 600 in 13 towns—the highest being unfortunate Merthyr Tydvil (1,149), Liverpool (1,069), Bootle (865) and Sunderland (848). Further statistics are given in the appendix (Table XII).

5. *Old Age Pensions.*

The first Act for old age pensions was passed in 1908. They were granted without contribution, to persons aged 70 or more, 5*s*. a week for those with means not exceeding £21 a year, and from 4*s*. to 1*s*., according to means, for those with more than that income and not more than £31 10*s*. a year.

Concessions were made during the war and, after it, in 1919, a new Act provided a pension of 10*s*. a week where means did not exceed £26 5*s*. a year, and of from 8*s*. to 1*s*. where means were above that figure but not above £49 17*s*. 6*d*. a year. The later measures of law are briefly these—in 1920 pensions granted to the blind at age 50 instead of 70 (the Government now propose to reduce the 50 to 40); in 1924 income up to £39 a year from savings, investments or voluntary allowances to be ignored in deciding right to, and amount of, pension (thus a man and his wife, both aged 70, might each receive the full pension of 10*s*. a week if their means did not exceed £39 + £39 + £26 5*s*. + £26 5*s*. = £130 10*s*. a year); in 1925 the Contributory Pensions Act provided that persons coming within its terms, and their wives or widows, at age 70 become entitled to the full pension of 10*s*. a week, regardless of means.

Statistics of old age pensions are given in Table VIII of the appendix: the following are the principal facts:—

In 1914 less than 700,000 persons were receiving pensions in England and Wales; in 1936 1,500,000.

In 1936 twice as many persons were receiving pensions as in 1914, in proportion to the population—37 per 1,000 as against 18½. I have previously dealt with future prospects.

Nearly 78 persons out of every 100 aged 70 or more received pensions in 1936.

59 per cent. of the recipients of old age pensions in 1936 were women.

Over 60 per cent. of the recipients in that year were receiving their pensions by virtue of the Contributory Pensions Act, as against a little over 26 per cent. in 1929.

Under £9m. was paid in pensions in 1913–14, over £38m. in 1935–36, being nearly 4¼ times as much in money as against under 2¼ times as many pensioners. An increasing proportion receive the full pension. The proportion with reduced pensions has always been small—under 6 per cent. in 1914, a little over 1½ per cent. in 1936.

The total paid in pensions averaged per head of population about 4*s*. in 1913–14 and nearly 19*s*. in 1935–36.

Two of the reasons for the increase in total payments are external—the rise in number of persons aged 70 or more, from approximately 1m. in 1914 to over 1·9m. in 1936, and the reduced value of money. Three are internal—the grant at a much earlier age of pensions to blind persons; the raising of the limit of means which are ignored; and the grant of full pensions to those benefiting from the Contributory Pensions Act.

I suppose that few, if any, would to-day desire the rates of pensions to be reduced or the conditions hardened. Much had been done to lighten the lot of the aged long before pensions were granted, and the more that was done the more that was demanded, less from the poor themselves than from their sympathizers. The grant of pensions was a great boon.

The relief to the poor law has not been so great as optimists thought—but that is usual! There are many for whom a pension cannot sufficiently provide; still, the proportion of pensioners receiving poor relief is not large, but it is rising, being 9·2 per cent. in 1936 (202,000 persons) as against 7 per cent. in 1931 (those in mental hospitals are excluded). All but some 30 per cent. are recorded as suffering from some infirmity of body or mind or from sickness.

Two conditions in particular in modern life (apart from the recent prolonged depression) tend to increase the number seeking public aid —prolonged individual life and reduced family life. Family ties have become, and are becoming, looser, and our very virtues may conduce to this result. For example, the old mother may not find so ready a refuge in the new housing estate or tenement as in the old slum or overcrowded quarters, and the question is not just one of accommodation, but also of general neighbourliness. Further, the better the provision made by Public Assistance Authorities for the aged, the less the reluctance to take advantage of it, and a good deal is being done to provide more suitable accommodation and more suitable care, sympathetic but not fussy, and many developments may be expected within the next few years if the Authorities are permitted to work out their solutions, with some discreet stimulation and guidance.

6. *Other Services.*

The following are some very brief particulars of other maintenance social services to which I have referred.

Housing.—Particulars of expenditure on housing were furnished in my paper published in the *Journal* last year (Vol. XCIX, Part III). I need only add that the expenditure of Local Authorities in the year 1934–35 reached a total of nearly £42m. in England and Wales (or nearly £37m. net after deducting rates), of which sum £13·4m. was met from specific Government grants and some £3·4m. from local rates and block grant.

Hospitals.—The following statistics are only for general hospitals of Local Authorities, not for hospitals for infectious or mental diseases. Most of these general hospitals have been transferred from the public assistance to the public health service. The gross revenue for each of the years from 1930–31 (when the expenditure was first separately shown in the returns) to 1934–35 have been as follows—£m.: 1·3; 3·2; 4·1; 4·7; 5·0. This sphere of expenditure may be expected to increase greatly, with the increasing transfer of hospitals from public assistance to public health, the building of new hospitals (such as that of 862 beds of the Surrey County Council at St. Helier), the increased use of public hospitals and the higher standards of service.

Maternity and Child Welfare.—The primary object of this work is preventive, to keep healthy children healthy and to improve standards. But in the aggregate a large amount of material aid and service is rendered. Separate figures of expenditure are not given for this latter part of the work.

The total expenditure on the whole service rose from £1·2m. in 1919–20 to £3·2m. in 1934–35. The rise has been most marked from 1925–26. An indication how much is done beyond the preventive is given by particulars in the Ministry of Health report for 1935–36 (pp. 242–4), which show, for example, that in 1935 nearly 93,000 women were admitted to maternity homes and hospitals (including former Poor Law institutions now transferred) and over 42,000 to voluntary institutions subsidized by Local Authorities, that over 31,000 sick or ailing children were admitted to Local Authority institutions (including transferred) and over 9,000 to other institutions assisted by them, and that nearly 73,000 cases (expectant mothers, children under 5 years of age and maternity and puerperal cases) were attended at home by nurses. Much material aid is afforded in the aggregate, particularly milk free or at reduced prices, and more is probable.

School Medical Treatment.—Treatment alone is included, not medical inspection, because the latter is a general communal service, like education, not a maintenance service. School treatment is restricted to dental and visual defects, adenoids and enlarged tonsils and minor ailments. The cost in public elementary schools rose from £216,000 in 1912–13 and £1·2m. in 1922–23 to £2·2m. in 1935–36 or, per school child, from 10*d.* and 4*s.* 8*d.* to 9*s.* 3*d.* In the schools for higher education the cost rose from £45,000 in 1922–23 to £88,000 in 1935–36.

Expenditure on medical treatment is but a small part of the total spent by Local Authorities on education, nearly £87m. in 1935–36; it has risen rapidly in recent years, but shows no present signs of expanding into new fields of treatment.

Feeding of School Children. The gross expenditure on this service in 1912–13 was under £170,000. The net expenditure reached nearly £1m. in 1921–22, a bad industrial year, and then fell rapidly, and was less than £140,000 in 1924–25, since when it has risen steadily, reaching over £610,000 in 1935–36, one exception being the lamentable year 1926–27, when it rose abruptly to nearly £800,000, with a similarly abrupt fall in the next year. There has been some agitation for more feeding of school children, some advocating the provision of at least one good meal a day to all children, a measure which the Board of Education estimate would cost some £24m. a year if the meal were taken by all pupils under age 18 in State-aided schools, over £40m. if on all days, not only school days; and, although this figure has been challenged, anyone knowing the trend in these matters once they are instituted will not be much inclined to question the estimate. In addition to the ordinary school feeding, provision is made for the sale of milk at a reduced price, with the aid of an Exchequer grant which has amounted to about £400,000 a year.

Welfare of the Blind. Expenditure on the blind (excluding that on "old-age pensions") is first shown separately in the official returns for 1928–29. The gross expenditure was then £340,000, the net £320,000; in 1934–35 the figures were £1·2m. and £1·1m. With better measures for preventing blindness the expenditure should not increase much, but there is no telling, especially with the lengthening of life.

This completes the present story of the public social services. The country has entered on courses still comparatively new, there are many pitfalls by the way and a good deal more hard thought is needed if these are to be avoided and if the best is to be obtained from the large expenditure to which we are committed.

APPENDIX.

FIGURES given in the following tables have been obtained from a number of official returns.

TABLE I.

Public Social Services—Expenditure on the Several Services in England and Wales.

(Figures in 000,000's; Services, £.)

Year ended March.	Population.	Unemployment.			National Health Insurance.	Contributory Pensions.	Old-age Pensions.	Housing.	Poor Relief.	Total (5 to 10).	Education.	Approved Schools.	Hospitals and Treatment of Disease.	Maternity and Child Welfare.	Lunacy and Mental Treatment.	Mental Deficiency.	Total (12 to 17).	War Pensions.	Grand Total.	Year ended March.
		Benefit.	Allowances.	Total.																
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.
1891	29·0	—	—	—	—	—	—	0·24	8·5	8·7	10·1	0·38	0·41	—	0·57	—	11·4	—	20·1	1891
1901	32·2	—	—	—	—	—	—	0·41	11·6	12·0	17·0	0·42	1·3	—	1·0	—	19·7	—	31·7	1901
1911	35·8	—	—	—	—	—	6·3	0·75	15·0	22·1	29·1	0·47	1·9	?	1·5	—	33·0	—	55·1	1911
1919	34·0	0·52	—	0·52	17·3	—	12·7	1·1	18·4	50·0	43·7	0·35	2·7	0·35	1·8	0·11	49·0	43·5	142·5	1919
1920	35·4	1·1	—	1·1	23·4	—	13·7	1·1	23·5	62·8	58·5	0·49	3·5	1·2	1·9	0·20	65·8	84·9	213·5	1920
1921	37·2	9·7	—	9·7	26·4	—	18·3	4·2	31·9	90·5	76·4	1·2	7·3	1·9	2·5	0·65	90·0	90·9	271·4	1921
1922	37·9	62·2	—	62·2	26·3	—	19·5	4·2	42·3	154·5	80·0	1·2	7·3	1·9	2·4	0·62	93·4	80·6	328·5	1922
1923	38·2	41·6	—	41·6	26·2	—	19·9	10·1	41·9	139·7	76·7	1·2	7·6	1·6	1·5	0·84	89·4	68·6	297·7	1923
1924	38·4	41·0	—	41·0	27·4	—	21·3	11·6	38·0	142·3	75·2	0·83	6·6	1·6	1·9	0·82	87·0	62·3	291·6	1924
1925	38·7	42·9	—	42·9	29·0	—	23·0	16·3	36·9	148·1	77·3	0·67	6·0	1·7	2·7	0·89	89·3	59·8	297·2	1925
1926	38·9	41·4	—	41·4	33·1	1·4	24·9	17·6	40·2	158·6	79·4	0·62	6·2	1·8	2·9	1·0	91·9	57·5	308·0	1926
1927	39·1	47·8	—	47·8	36·7	6·6	27·4	19·9	49·8	188·2	80·1	0·61	6·5	2·2	2·9	1·1	93·4	51·1	335·7	1927
1928	39·3	38·3	—	38·3	33·7	10·6	29·9	23·2	41·0	176·7	81·6	0·58	6·8	2·1	2·5	1·2	94·8	51·2	322·7	1928
1929	39·5	47·5	—	47·5	36·0	21·2	30·9	27·5	39·7	202·8	83·9	0·57	7·1	2·2	2·4	1·4	97·6	48·5	318·9	1929
1930	39·6	46·7	—	46·7	34·7	23·6	31·7	30·9	40·7	208·3	87·0	0·51	7·4	2·4	2·4	1·4	101·1	46·2	355·6	1930
1931	39·8	71·3	17·1	88·4	34·7	30·8	33·3	35·2	38·6	261·0	90·4	0·52	9·2	2·9	2·6	1·9	107·5	44·3	412·8	1931
1932	40·0	78·5	27·2	105·7	33·5	35·4	34·4	35·2	36·9	281·1	89·6	0·52	9·2	2·9	2·5	1·8	106·5	42·3	429·9	1932
1933	40·2	56·7	45·1	101·8	33·6	36·4	36·0	37·3	39·0	284·1	87·6	0·52	10·7	3·0	2·5	2·1	106·4	40·1	430·6	1933
1934	40·4	43·5	43·4	86·9	32·3	37·6	36·6	39·1	40·2	272·7	88·4	0·50	11·5	3·1	2·7	2·3	108·5	38·6	419·8	1934
1935	40·5	46·6	38·1	81·7	32·8	38·5	37·8	40·2	42·5	276·5	91·9	0·50	12·4	3·1	2·8	2·6	113·3	37·0	426·8	1935
1936	40·6	45·7	38·9	84·6	33·9	39·8	39·1	—	—	—	97·4	0·54	—	—	—	—	—	36·4	—	1936

Years. The figures for housing, approved schools, hospitals and treatment of disease, maternity and child welfare, lunacy and mental treatment and mental deficiency are for one year earlier than that in the first column. The figures for 1935–36 are estimates.

Population. Except for the Census years, the figures are the estimated population in the middle of each calendar year. Those for the years ended March 1919–21 are only for the civil population.

Unemployment Allowances. The figures include similar payments previously made under the name of transitional benefit or transitional payments.

Lunacy and Mental Treatment. Payments made towards rate-aided patients are included under Poor Relief, not under this heading.

Services. Expenditure under the Unemployed Workmen Act and the Inebriates Act were included in the returns for the years these were in force; and in the earliest returns also certain general expenditure under the Public Health Acts, including that on sewerage and sewage disposal, and collection and disposal of house refuse.

TABLE II.

Public Social Services—Receipts for the Year ended March 31, 1935. *England and Wales.*

£m.

Service.	Receipts from—					Total Expenditure.
	Parliamentary Vote.	Local Rates and Block Grants.	Total from Public Funds.	Contributions, Fees, Interest, Rent, etc.	Total.	
1. Unemployment Insurance	18·9	—	18·9	37·9	56·8	46·6
2. Unemployment Payments and Allowances	38·2	—	38·2	—	38·2	38·2
3. National Health Insurance	6·0	—	6·0	30·1	36·1	32·8
4. Contributory Pensions	11·7	—	11·7	21·4	33·1	38·5
5. Old-age Pensions ...	37·8	—	37·8	—	37·8	37·8
6. Housing	13·2	2·6	15·8	24·3	40·2	40·2
7. Poor Relief	0·32	39·0	39·3	3·3	42·6	42·6
8. Totals of 1 to 7 ...	126·1	41·6	167·7	117·0	284·7	276·7
9. Education	41·9	42·4	84·3	7·5	91·9	91·9
10. Approved Schools ...	0·21	0·24	0·45	0·051	0·5	0·5
11. Public Health, (1) Hospitals and Treatment of Disease	0·062	11·6	11·6	0·76	12·4	12·4
12. Public Health, (2) Maternity and Child Welfare	0·026	2·6	2·6	0·46	3·1	3·1
13. Mental Treatment ...	0·071	1·5	1·6	1·2	2·8	2·8
14. Mental Deficiency ...	0·13	2·2	2·4	0·2	2·6	2·6
15. Totals of 9 to 14 ...	42·4	60·6	103·0	10·2	113·2	113·2
16. War Pensions	37·0	—	37·0	—	37·0	37·0
17. Grand Totals	205·6	102·2	307·8	127·1	434·9	426·8

Year. See note to Table I.

Contributory Pensions. A proportion of the total State contribution for this year (£13m.) for England, Wales, and Scotland, has been allocated in the above table to the two former countries.

Mental Treatment. See note to Table I.

TABLE III.

Unemployment Insurance, Transitional Payments, Unemployment Allowances, etc. Numbers Insured, Receipts, Payments, etc.

(Figures in millions, except those in parentheses, which are in thousands.)

Year.	Nos. Insured.			Receipts, £.									Payments, £.									Balance of Fund at end of Year. £		Treasury Advances outstanding. £	Year.
				Contributions from—									Benefits, Transitional Payments, etc.												
						Exchequer.																			
	Males.	Females.	Total.	Employers and Employed.	Defence Depts.	Ordinary.	Transitional Payments, etc.	Deficiency Grant.	Total.	Interest.	Other.	Total.	Direct.	Association.	Total.	Administrative Expenses.	Refund at Age 60.	Compensation on Abolition of Refunds.	Interest on Advances and Debt Repayment.	Other.	Total.	Debit.	Credit.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.
1921–22	8·0	3·1	11·1	30·6	(820)	11·1	—	—	11·1	(554)	(30)	43·0	45·2	7·7	52·8	4·8	(47)	—	(473)	(247)	58·5	15·0	—	11·3	1921–22
1922–23	8·2	3·0	11·2	34·0	(444)	12·2	—	—	12·2	—	(31)	46·7	38·8	3·1	41·9	4·5	(191)	—	(803)	(553)	47·9	16·1	—	15·3	1922–23
1923–24	8·3	2·9	11·2	36·7	(271)	13·2	—	—	13·2	—	(25)	50·2	33·7	2·3	36·0	4·1	(379)	—	(601)	(150)	41·2	7·1	—	6·7	1923–24
1924–25	8·1	3·0	11·1	36·7	(293)	13·1	—	—	13·1	—	(14)	50·2	12·0	2·6	41·6	4·6	(595)	1·3	(302)	(155)	51·6	8·4	—	8·1	1924–25
1925–26	8·6	3·1	11·6	33·6	(319)	12·9	—	—	12·9	—	(19)	46·9	40·3	3·4	43·7	1·9	(95)	(16)	(376)	(114)	49·3	10·9	—	10·5	1925–26
5/7/26–31/3/27	8·7	3·1	11·8	20·3	(255)	8·0	—	—	8·0	—	(13)	28·6	35·1	3·6	38·7	3·5	(14)	(14)	(414)	(109)	42·8	25·1	—	24·7	5/7/26–31/3/27
1927–28	8·7	3·1	11·9	30·9	(279)	12·0	—	—	12·0		(10)	43·2	34·6	1·9	36·5	4·9	(17)	(18)	1·2	(185)	42·8	24·6	—	21·5	1927–28
1928–29	8·5	3·2	11·6	30·2	(368)	11·8	—	—	11·8	—	(17)	42·3	14·5	2·3	16·7	5·1	(11)	(18)	1·7	(157)	53·7	36·0	—	36·0	1928–29
1929–30	8·6	3·2	11·8	30·0	(371)	15·1	4·0	—	19·1	—	(20)	50·1	44·0	2·0	45·9	5·5	(6)	(38)	1·8	(159)	53·1	39·0	—	39·0	1929–30
1930–31	8·8	3·4	12·1	29·3	(395)	11·8	20·3	—	32·1	—	(22)	61·9	87·4	1·8	92·2	6·3	—	—	2·5	(239)	101·3	75·5	—	75·4	1930–31
1931–32	9·0	3·5	12·5	33·3	(417)	16·8	32·4	(415)	49·6	—	(25)	83·3	101·5	6·5	110·0	7·0	—	—	4·7	(231)	122·8	115·0	—	115·0	1931–32
1932–33	9·1	3·4	12·5	38·1	(358)	19·2	53·8	6·4	79·1	—	(21)	117·8	99·1	5·5	101·6	7·6	—	—	5·4	(220)	117·8	115·0	—	115·0	1932–33
1933–34	9·2	3·4	12·6	39·3	(290)	19·8	53·2	—	72·0	(13)	(23)	111·6	85·0	3·6	88·6	7·5	—	—	5·3	(212)	101·6	105·0	—	106·7	1933–34
1934–35	9·3	3·4	12·7	41·8	(116)	21·0	45·6	—	66·6	(32)	(20)	108·9	83·2	2·8	86·0	7·6	—	—	5·0	(225)	98·8	—	10·9	105·7	1934–35
1935–36	9·9	3·8	13·7	43·4	(519)	21·9	45·0	—	66·9	(218)	(11)	111·1	83·4	1·7	85·1	7·3	—	—	5·0	(345)	97·7	—	24·2	105·2	1935–36
1936–37	10·1	3·9	11·0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1936–37
Total	—	—	—	508·8	5·8	223·2	253·3	6·8	483·3	(837)	(316)	999·1	900·8	53·8	954·2	85·2	1·3	2·5	35·6	3·3	1081·2	—	—	—	

Year. The years 1921–22 to 1925–26 are "insurance years" (July to July); the years 1927–28 onwards are financial years (April to March).

Nos. Insured. The figures are for Great Britain, and show the number insured in July of each year (1921, 1922, etc.). From 1921–22 to 1927–28 they relate to persons aged 16 and over; from 1928–29 to 1934–35 to those aged 16–64; for 1935–36 and 1936–37, those aged 14–64 (but excluding persons in the new agricultural scheme).

Financial Figures. These are for Great Britain and Ireland up to 31/12/21, after which Northern Ireland is excluded and, after 31/3/22, the Irish Free State; after that date the figures are for Great Britain. They do not include figures for the special schemes for Banking and Insurance (but persons in these schemes are included in the numbers insured).

Benefits, Transitional Payments, etc. These figures include payments and administrative expenses for transitional benefits, transitional payments, and unemployment allowances to the following amounts for 1929–30 and each of the succeeding years (the figures in parentheses show the administrative expenses)—£m.: 3·7 (0·3); 19·2 (1·1); 30·7 (1·6); 50·4 (3·4); 48·4 (3·7); 42·2 (3·4); 42·4 (2·6).

TABLE IV.

National Health Insurance - Membership, Receipts, Payments and Funds: England and Wales.

(All figures in millions, except those in parentheses, which are in thousands.)

Year.	Nos. Insured.			Receipts, £.				Expenditure, £.									Accumulated Funds at end of Year (£).	Year.
								Benefits.						Administration.				
	Males.	Females.	Total.	Contributions.	Interest, etc.	Votes and Grants.	Total.	Sickness.	Disablement.	Maternity.	Medical.	Other.	Total.	Approved Societies.	Central Depts.	Total.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	11.	15.	16.	17.	18.	19.
1914	8·6	3·6	12·1	14·9	(540)	5·0	20·4	5·8	(162)	1·2	4·9	(752)	12·8	2·0	(586)	2·6	20·2	1914
1921	9·1	4·3	13·4	22·5	3·3	10·4	36·3	7·2	2·7	1·7	9·4	(566)	21·6	3·4	1·3	4·8	82·0	1921
1922	9·1	4·3	13·4	22·4	3·7	7·4	33·5	8·2	3·3	1·6	8·5	(358)	22·0	3·3	1·0	4·3	89·5	1922
1923	9·3	4·5	13·8	23·4	4·2	6·2	33·8	7·8	3·8	1·5	8·2	(585)	21·8	3·4	(941)	4·3	97·5	1923
1924	9·6	4·7	14·3	24·5	4·8	6·2	35·5	8·8	4·2	1·5	8·0	(633)	23·2	3·4	(913)	4·3	104·2	1924
1925	9·7	4·8	14·5	24·8	5·0	7·2	37·0	9·3	4·5	1·5	8·5	(820)	24·6	3·4	(931)	4·4	113·1	1925
1926	10·0	4·9	14·9	22·0	5·3	6·3	33·5	11·3	5·5	1·5	8·6	1·7	28·6	3·6	(913)	4·5	113·0	1926
1927	10·2	5·0	15·2	23·7	4·9	6·8	35·4	11·8	6·4	1·5	8·8	3·5	32·0	3·7	(921)	4·6	111·8	1927
1928	10·4	5·2	15·6	23·3	5·0	6·4	34·7	10·2	5·5	1·5	9·1	2·7	29·0	3·8	(891)	4·7	112·9	1928
1929	10·6	5·3	15·9	23·3	4·9	6·9	35·1	12·0	5·8	1·5	9·3	2·5	31·1	3·9	(952)	4·8	112·0	1929
1930	10·8	5·4	16·2	23·4	5·5	6·6	35·5	10·1	5·7	1·6	9·2	3·0	29·6	4·1	(959)	5·1	112·8	1930
1931	10·9	5·4	16·4	23·2	5·4	6·4	34·9	10·0	5·5	1·5	9·6	3·0	29·6	4·2	(940)	5·1	114·0	1931
1932	11·0	5·4	16·5	23·8	5·4	5·5	34·8	9·9	5·6	1·5	9·0	2·5	28·5	4·1	(906)	5·0	113·9	1932
1933	11·0	5·4	16·4	23·5	5·3	5·4	34·1	10·2	5·5	1·4	9·2	2·3	28·5	4·2	(912)	5·1	113·8	1933
1934	11·0	5·5	16·5	24·0	5·6	5·6	35·2	8·9	5·7	1·4	9·1	2·3	27·3	4·1	(930)	5·0	116·3	1934
1935	11·0	5·5	16·5	24·4	5·5	6·0	35·9	9·1	5·7	1·4	9·4	2·2	27·8	4·1	(943)	5·0	119·2	1935

Figures for 1914 are for 12/1/14 to 31/12/14; other figures for calendar years.
Disablement benefit began in July 1914.
Sanatorium treatment is included in " other benefits " to 1/5/21; since then transferred to Public Health.
Contributions. Certain sums were transferred from Contributory Pensions Accounts to N.H.I. Central Fund in 1932–35 (as part of economy measures) and are included under " Contributions."

TABLE V.

National Health Insurance: Additional Benefits in England in the Year 1936.

Additional Benefits.	No. of Schemes.	Membership Covered.	% of Membership Covered.
Cash only	71	42,000	0·3
Treatment only	319	2,864,000	21·3
Cash and treatment	4,954	10,516,000	78·4
Total	5,344	13,422,000	100·0

Cash Benefits. Over 7 million members were covered by schemes giving 1 to 5 units of additional benefits, a unit being 1*s.* a week sickness benefit, 6*d.* a week disablement benefit and 2*s.* a week maternity benefit. Of the 7 million, over 3·3 million were covered for 3 units and nearly 1·4 million for 5 units. The average for all members covered by additional cash benefits is just under 3½ units.

Treatment Benefits. Allocations in 1936 for additional treatment benefits were as follows:—

Benefit.	No. of Societies.	Membership Covered.	Amount Allocated.
		000,000's.	£000's.
Dental	4,863	11·7	2,144
Ophthalmic	4,808	10·0	517
Convalescent Home Treatment ...	2,593	10·8	202
Medical and Surgical Appliances ...	3,941	11·3	191
Hospitals	2,286	1·6	91
Want or Distress	765	6·2	37
Approved Charitable Institutions ...	410	7·5	34
Nursing	625	6·4	31
Convalescent Home Premises	19	0·2	19
Infection...	83	3·9	5
Convalescent Allowances	17	0·4	2
Total	—	—	3,274
Donations	633	—	30
Grand Total	—	—	3,304

The donations are voluntary subscriptions or donations to hospitals and other charitable institutions. They are not strictly additional benefits, but, like them, are paid out of disposable surpluses after valuation.

TABLE VI.

Widows', Orphans', and Old Age Contributory Pensions Acts: Number of Insured and of Beneficiaries: England and Wales.

On December 31.	Insured (000,000.)			Beneficiaries (000).									Grand Total.	On December 31.
				Widows.		Children and Orphans.		Pensioners, 65–70.		Total (cols. 5 to 10).	Pensioners (70 and over) by virtue of O.P. Acts.			
	Males.	Females.	Total.	Contributory.	Non-contributory.	Contributory.	Non-contributory.	Men.	Women.		Men.	Women.		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1926	10·2	5·0	15·2	44·0	99·3	35·6	192·9	—	—	371·8	84·1	30·1	486	1926
1927	10·4	5·1	15·4	95·5	84·8	73·6	161·5	—	—	415·4	143·2	57·7	616	1927
1928	10·6	5·3	15·9	143·8	70·9	105·1	137·1	320·9	159·5	937·3	188·5	101·8	1,228	1928
1929	10·8	5·4	16·1	198·7	59·6	140·2	115·7	334·4	178·5	1,027·1	233·1	130·5	1,391	1929
1930	11·0	5·5	16·4	246·6	249·9	172·6	100·6	351·8	214·7	1,336·2	280·1	180·3	1,796	1930
1931	11·1	5·5	16·6	292·7	304·8	199·4	85·1	371·7	224·7	1,478·4	314·3	237·3	2,030	1931
1932	11·2	5·5	16·7	333·2	285·5	220·7	68·9	383·9	232·4	1,524·6	349·6	291·7	2,166	1932
1933	11·2	5·5	16·7	374·8	267·3	240·4	54·4	398·2	242·0	1,577·1	383·0	344·9	2,305	1933
1934	11·2	5·5	16·8	408·9	248·9	245·8	39·9	410·8	253·3	1,607·6	414·6	398·3	2,420	1934
1935	11·3	5·6	16·9	443·3	230·2	248·6	27·6	424·6	266·1	1,640·4	444·5	450·1	2,535	1935

Contributory Pensions were payable from 4/1/26 to widows of insured men dying on or after that date.

Non-contributory Pensions. Under Act of 1925 granted to widows with children—pensions paid also for children and for orphans. Under Act of 1929 pensions granted to widows aged 60 or more (from 1/7/30) and aged 55 or more (from 1/1/31).

Old Age Pensions came into force on 2/1/28 for age 65 to 70.

TABLE VII.

Contributory Pensions: Receipts and Payments in England and Wales.

Year ended March 31.	Contributions.	Expenditure.					
		Pensions.				Administration, etc.	Total.
		Widows.	Orphans.	Old Age, 65–70.	Total.		
	£m.	£m.	£000.	£m.	£m.	£m.	£m.
1927	23·3	6·9	280	—	7·2	0·83	8·0
1928	20·9	6·8	259	2·7	9·8	0·80	10·6
1929	20·9	7·8	261	12·2	20·3	0·91	21·2
1930	21·6	9·1	270	13·2	22·6	0·98	23·6
1931	21·1	14·7	291	14·7	29·6	1·20	30·8
1932	19·6	18·4	300	15·5	34·2	1·16	35·4
1933	20·1	19·0	311	15·9	35·3	1·14	36·4
1934	20·7	19·8	322	16·4	36·5	1·11	37·6
1935	21·4	20·2	316	16·9	37·4	1·14	38·5
1936	23·0	20·9	305	17·5	38·7	1·13	39·8

Contributions. The figures under this heading are the receipts less refunds, transfers to the Central Fund, etc.

1932—£1,000,000 was transferred in the year ended March 1932 to the Central Fund (N.H.I.) in respect of the years 1928–31, under a National Economy Order.

1936—The rates of contributions were increased from January 6, 1936.

See also notes to previous table.

TABLE VIII.

Old Age Pensions from Age 70: England and Wales.

("C." at the head of a column signifies pensions granted by virtue of the Contributory Pensions Act; "N.C." other pensions.)

Years ended March 31.	No. of Pensions on last Friday in March.										Total Amount Paid in Pensions.			Years ended March 31.
	Men.			Women.			Total, Men and Women.			No. at Reduced Rates.				
1.	N.C. 2.	C. 3.	Total. 4.	N.C. 5.	C. 6.	Total. 7.	N.C. 8.	C. 9.	Total. 10.	11.	N.C. 12.	C. 13.	Total. 14.	15.
						000						£m.		
1914	251	—	251	434	—	434	685	—	685	30	8·6	—	8·6	1914
1922	265	—	265	497	—	497	762	—	762	53	19·4	—	19·4	1922
1924	292	—	292	523	—	523	815	—	815	57	20·6	—	20·6	1924
1926	357	—	357	597	—	597	953	—	953	28	24·0	—	24·0	1926
1929	277	201	478	584	107	691	861	308	1,169	23	23·1	7·1	30·2	1929
1930	256	243	500	581	138	720	838	382	1,220	24	22·0	8·9	31·0	1930
1931	235	288	523	559	192	751	795	480	1,275	23	21·3	11·3	32·6	1931
1932	218	321	539	530	247	776	748	567	1,316	23	20·0	13·6	33·7	1932
1933	202	355	557	499	305	804	701	660	1,361	22	19·0	16·3	35·3	1933
1934	191	390	581	475	357	832	667	747	1,413	23	17·7	18·3	36·0	1934
1935	181	421	602	452	412	864	634	833	1,466	23	16·7	20·5	37·2	1935
1936	170	448	618	426	460	886	596	908	1,504	23	15·8	22·7	38·5	1936

Rate of Pensions. For 1914, 5*s.* (with reduced rates of 4*s.* to 1*s.*). From 1922 onwards 10*s.* (and 8*s.* to 1*s.*).
Means. Concessions made by an Act of 1924 increased the number of pensions and the proportion of full pensions.

TABLE IX.

Public Assistance—Persons in Receipt of Relief in England and Wales per 10,000 *of Population* (*see also* Table X).

Year ended March.	Institutional Relief.	Domiciliary Relief.	Total.	Year ended March.	Institutional Relief.	Domiciliary Relief.	Total.
1910	78	152	259	1924	56	282	365
1911	77	142	248	1925	55	235	317
1912	74	113	216	1926	56	258	341
1913	73	113	215	1927	57	441	526
1914	70	106	204	1928	56	248	333
1915	68	106	203	1929	56	228	314
1916	61	98	187	1930	55	216	300
1917	57	87	171	1931	53	193	276
1918	53	80	159	1932	50	216	296
1919	49	76	148	1933	48	271	350
1920	48	79	150	1934	46	287	364
1921	52	96	170	1935	44	295	372
1922	55	277	357	1936	42	287	361
1923	56	341	423				

Up to 1920, the figures are the mean number of persons relieved at the beginning of July and of January in each year ended March.

From 1921, the figures are the average weekly numbers relieved.

The two methods do not yield very different figures; the latter generally gives larger numbers.

The figures for institutional and domiciliary relief exclude rate-aided patients in mental hospitals and casuals. The total figures include them.

TABLE X.

Public Assistance: No. of Persons who were relieved and not classified as suffering from sickness, accident or bodily or mental infirmity.

(Rate per 10,000 of Population.)

On January 1.	Institutional Relief.	Domiciliary Relief.	Total.	On January 1.	Institutional Relief.	Domiciliary Relief.	Total.
1912	14	19	33	1926	14	94	108
1913	14	23	37	1927	15	111	126
1914	12	17	29	1928	16	84	100
1915	15	17	32	1929	15	66	81
				1930	15	59	74
1920	10	13	23	1931	14	49	63
1921	11	20	31	1932	14	66	80
1922	13	115	128	1933	14	92	106
1923	12	116	128	1934	14	96	110
1924	12	92	104	1935	13	103	116
1925	14	68	82	1936	13	91	104

(1). The figures of institutional relief for 1912–14 and of domiciliary relief for 1912 are the mean figures for the year (not for January 1), and are for persons over 16 years of age then classified as "ordinarily able-bodied," which included persons temporarily disabled by sickness or accident. This classification was dropped in 1913 for domiciliary relief and in 1915 for institutional relief.

(2). The domiciliary figures for 1913 include some wives suffering from sickness, accident, or bodily or mental infirmity, who were relieved with their husbands.

(3). Casuals are excluded.

TABLE XI.

Public Assistance: Persons Receiving Out-relief, showing those Insured, etc.

(Rate per 10,000 of Population.)

During Month of January.	Persons Ordinarily Engaged in Regular Occupation.						Others and their Dependants	Total.	Other Persons	All Persons.
	Persons Holding Card U.I. 40 (Insured).			Persons Holding Card E.D. 24 (Uninsured).						
	Unemployed Persons.	Wives and Dependent Children.	Total.	Unemployed Persons	Wives and Dependent Children	Total.				
1922	Figures not available.							227	105	332
1923								201	114	315
1924								159	118	277
1925								103	125	228
1926								147	128	275
1927	34	85	119	Not available		11	35	165	124	289
1928	27	71	98			9	26	133	121	254
1929	19	51	70			10	27	107	122	229
1930	14	39	53			11	30	94	126	220
1931	10	26	36			9	56	101	125	226
1932	15	39	54	6	10	16	38	108	130	238
1933	24	58	82	10	17	27	48	157	143	300
1934	24	55	79	12	19	31	46	156	146	302
1935	24	53	77	14	22	36	49	162	151	313
1936	16	33	49	14	21	35	52	136	159	295

(1). The figure for January in each year is the average for each week.

(2). *Card U.I.* 40 is issued by the Employment Exchanges to insured persons registered as unemployed.

Card E.D. 24 is a card similarly issued to uninsured persons registered as unemployed.

TABLE XII.

Public Assistance: Administrative Counties and County Boroughs: Number of persons receiving relief on June 27, 1936.

(Per 10,000 of Population.)

No. per 10,000.	No. of Authorities with Relief as in First Column.			
	Administrative Counties.		County Boroughs.	Total.
	London.	Others.		
1,000 and over	—	—	2	2
800 and under 1,000	—	—	2	2
600 " " 800	—	2	9	11
400 " " 600	—	3	16	19
300 " " 400	—	7	15	22
200 " " 300	1	20	23	44
100 " " 200	—	29	14	43
Under 100	—	—	2	2
Total	1	61	83	145
No. per 10,000 for Authorities as a whole	280	239	426	305

Administrative Counties with the highest proportion per 10,000 are—Durham 724, Glamorgan 679, Monmouth 566, Anglesey 436, Brecknock 422. With the lowest—Bedford, West Sussex, Surrey, East Sussex, Bucks., Westmorland, each with not more than 120.

County Boroughs with the highest are—Merthyr Tydvil 1,149, Liverpool 1,069, Bootle 865, Sunderland 848, Gateshead 778, Lincoln 722. With the lowest—Oxford 81, Blackpool 98, Halifax 109, Coventry 117, Gloucester 128.

TABLE XIII.

Public Assistance: Expenditure in England and Wales per head of the Population on relief of the poor and connected purposes.

Year ended March.	Expenditure (to nearest Penny).	Year ended March.	Expenditure (to nearest Penny).
	s. *d.*		*s.* *d.*
1889	5 11	1923	22 0
1894	6 6	1924	19 9
1899	7 2	1925	19 0
1904	8 1	1926	20 7
1909	8 4	1927	25 6
		1928	20 10
1913	8 2	1929	20 1
1914	8 3	1930	20 6
		1931	19 5
1919	9 10	1932	18 5
1920	12 7	1933	19 5
1921	17 0	1934	19 11
1922	22 4	1935	21 0

DISCUSSION ON SIR GWILYM GIBBON'S PAPER.

SIR HARRY HAWARD: The very pleasant duty has been assigned to me of proposing a vote of thanks to the author of this paper. I have known him for a number of years, and been more or less closely associated with him in local government matters. I do not think there is anyone who is better equipped to present to this Society a survey of the problem of the public social services. His experience has indeed been unique, and I think we may gather from the observations that have just fallen from him—supplementary to a large extent to the paper itself—that he is an absolute master of the subject in hand. Those very remarks place one, perhaps, in a little difficulty in commenting on the paper itself, because in certain respects they travel somewhat outside the course adopted throughout the paper.

My approach to the matter is largely influenced by a long association with local government, and therefore the financial rather than the social side of the statistics appeals to me. I have only a few words to say upon them. From this point of view Table I is of paramount importance, and to anyone engaged in local government, and interested in the aspects of administration represented in this Table, it is, to my mind, absolutely fascinating. In the first place, I desire to support the suggestion of Sir Gwilym that the form of this Table should be considered by the Society. Many changes have taken place since the form was originated. I was speaking only a few moments ago on this very point to Mr. Geoffrey Drage, to whose initiative the return was largely due, and he said that for the last twenty years he had been engaged in trying to improve the form of this Table. The society will therefore have a difficult task in suggesting practical improvements.

I presume that in such an enquiry the Society's consideration would take place in conference with the Ministry of Health and other government departments concerned, but I think something more is required than a mere improvement in form. When the form has been improved and the results emerge, it seems to me, particularly after some observations made this afternoon by the author of the paper, that the matter demands the close consideration of some Permanent Committee of the Government. There is, I believe, a Chief Economic Adviser of the Government. I am not sure what his particular functions are, but I suggest that such a return should come under his consideration.

In regard to the Table, I gather that the author has some doubt whether War Pensions ought to be included as a social service. My own view is that they should not be included: it seems to me that the expenditure on War Pensions is really part of the cost of the Defence Services themselves and should therefore be excluded from this return although the expenditure on War Pensions has a social significance.

I am loth to suggest any additional work to the author of such a paper as this, but some of you may consider, as I do, that it would have been an improvement if some of the Tables, particularly Table I, could have been accompanied by graphs.

Turning again to Table I, the growth of expenditure during something over a generation is startling, if not alarming. From £20 mn. in 1891 it has advanced to £390 mn., excluding War Pensions, in 1935. The expenditure in the earlier year was almost wholly confined to Poor Relief and Education, and the vast increase of £370 mn. is due largely to new services such as unemployment, national health, pensions and housing, while the rest of the increase is mostly due to education. The author points out that whereas the expenditure worked out to under 15*s*. per head in 1891, it is now 210*s*., an increase of 1300 per cent. He rightly emphasizes that this vast expenditure depends upon public policy, which in the course of the last generation has made rapid advances in the direction of social betterment. No Government has been able to resist this, even if it wished to do so.

Table II shows us that the expenditure of 1935 was met as to £270 mn. out of Public Funds, but does not give, what is of special interest to me, the amount contributed by the local rates. I think I am right in saying that if one deducts from column 2 the amount of the block grants, one would arrive at the figure which actually fell on the local rates. The outstanding fact is the much larger proportion of public money provided from central sources; compared with 1910–11 the central payments have increased more than eight times. Speaking from the point of view of Local Authorities, I must say that in the old days the Government Departments, notably the Ministry of Health and Board of Education, acted largely as brakes upon local expenditure and borrowings in respect of these social services whereas in recent years they have, by increased government grants and otherwise, stimulated the expenditure of the Local Authorities on these services.

Sir Gwilym has suggested that expenditure is not necessarily a test of efficiency: in other words, it by no means follows that the larger the expenditure, the greater the value received by the public, and I think this is particularly so in education. I was associated with a body where there was a school of thought which assumed that the more money was spent, the more efficient was the education given, and applied this test to their education policy without reference to the decline in child population which, in the County of London, has been serious in the last twenty years. There is no reference in the paper to the largely increased borrowings of the local bodies for these social services. Of course, the interest and repayment charges on the loans are included in the expenditure given, but there is no reference to the enormous loan commitments undertaken by the Local Authorities in recent years, particularly in reference to housing.

The crucial question really is, "Can the nation afford it?" On this head the author is rather reassuring. He points out that, after all, the percentage of national income spent on public social services is only just over 9 per cent., which can scarcely be called exorbitant, and he mentions that in 1934 we spent some £340 mn. in England and Wales on liquor and tobacco (Scotland, be it noted, is excluded). Personally I am inclined to agree with Sir Gwilym that this is not a very alarming proportion, and that the nation ought to be able to afford it, but, as he has said again this afternoon, everything depends upon the wealth of the country, *i.e.* on the total of production; the maintenance of these services at their present very high standard entirely depends upon the industrial capacity of the country.

I will end by paying a very just tribute to Sir Gwilym for his paper, which is a valuable contribution to one of the most difficult problems that faces us in this country.

PROFESSOR J. H. RICHARDSON: I have great pleasure in seconding the vote of thanks to Sir Gwilym Gibbon for his interesting paper. He has given us the benefit of his experience in the public services, and has covered a wide field of related activities in a most comprehensive way. I should like first of all to raise the question of the value of comparing total expenditure in 1891, or even 1911, with that in recent years. Such comparisons do little more than indicate that before the War this country still largely applied a *laissez faire* policy, whereas since the War the principle of social responsibility has been extensively adopted. Also it seems of doubtful value to compare a total for 1911, which does not include unemployment insurance, health insurance, contributory pensions, war pensions and other schemes, with a total for 1935 which includes these services. There would seem to be advantages in including in the totals only those services which have been in operation throughout the whole period. The figures would not then be complicated by major changes in public policy. I agree that war pensions might be omitted altogether from the statistics: if they are included, why not also include the pensions paid to civil servants and local government officials?

If misunderstanding is to be avoided the totals need correction for the growth of population by giving figures per head of the population, for changes in the value of money and for changes in the national income. It would be useful to give, with the total expenditure each year, the proportion which this total represents of the national income in the same period.

Then there is the question of the burden or cost of the services. The figures convey to many the impression that the services are provided out of public funds. A large part of the cost is borne by the groups covered by the services, either by direct or indirect contributions, including indirect taxation. It would be useful if the amounts from rates and taxes were distinguished from direct contributions. In the joint contributory insurance schemes, it is, I think, probable, after the schemes have been in operation for a number of years and wage changes have taken place, that not only the workers' contributions but also the employers' contributions could have been largely available for payment as wages to individual workers, but instead they are pooled as compulsory savings out of wages to cover specified risks. It would be interesting to know how far the burdens were borne in 1911 or in the nineteenth century by voluntary private methods. The aged were maintained, though not as well as at present: the unemployed lived, though their resources were less than at present. How far did other members of the families and various voluntary organizations incur in the nineteenth century at least some of the charges now borne by the public social services ? It will be widely agreed, however, that we now cover the risks much more effectively by collective measures.

There is a statement in the paper that the amount a nation can afford to spend on social services will depend largely on the excess of income over that needed for primary necessities and comforts. This seems to me to be a wrong approach. The social services make provision for the poorest sections of the community, and we should not regard these services as luxuries, only to be afforded when the community becomes richer, but as necessities which must be covered before other less essential expenditure is incurred. I, too, would wish to avoid increasing Sir Gwilym Gibbon's task by asking him to add other sections to his paper, but it would have been useful if accident compensation had been included. I know it has special features, but it is also the part of our social insurance system which is most in need of revision.

I am glad that Sir Gwilym emphasized the problem of old age. As we improve the education and health of the nation, we increase the value of the older people. It, therefore, seems to me undesirable that they should be withdrawn from industry and professional life at an earlier age. They are probably fit enough to continue at work several years longer than a few generations ago.

In conclusion, I should like to say, from my experience of the operation of these services, that a valuable development would be the association with the public services of a greater amount of personal service. The present system tends to be too impersonal, consisting chiefly of organization for the payment of cash benefits. We should, I think, combine more personal social service alongside the financial, perhaps by means of voluntary organizations working in association with the public services. It would also be useful if non-financial benefits, *i.e.*, various types of benefit in kind, whether individual or communal, could be developed. The public social services can be improved in various ways, especially as they have been haphazard in their growth, but they have worked remarkably well and have resulted in a great diminution of poverty.

I have much pleasure in seconding this vote of thanks.

MR. DALE said that his sole excuse for standing up was a letter from the Secretaries. Being a civil servant, he was always reluctant to take a public part in these discussions. Nevertheless he was glad to pay a tribute to his friend, Sir Gwilym Gibbon, for a masterly survey of this subject. It was obvious that besides having an unrivalled grasp of details, he was able to see the wood as well as the trees.

He had himself been occupied at one time or another with the administration of all of these social services, and he would like to add his testimony to the general accuracy of Sir Gwilym's account. The longer one was connected with administration of this kind, the greater one felt the paramount influence of public opinion, and it was of the first importance—and here he was sure Sir Gwilym would agree, as would many others who had had similar responsibility—that public opinion should be properly and readably informed. In this regard the paper was particularly valuable, and Mr. Dale hoped that it would be widely read. It was desirable that those interested in these social services also should see the wood as well as the trees.

The main question when considering the social services as a whole was whether the country could afford them. Sir Gwilym was reassuring on this matter, and those who had worked in the Ministry of Labour were the last people to be pessimistic. They had lived through some terrible years and, although unemployment was heavy enough at present, they were sensible of and grateful for a considerable improvement. They were too battered by recent experiences to be speculating actively on the next depression, which, it was to be hoped, was far enough away yet. Nevertheless, the burden of taxation was no empty phrase, and the cost of the social services was formidable. It was by no means the only, or indeed the main, item in Government expenditure, to which was now being added the cost of rearmament. It would be a mistaken charity to act as if this matter were unimportant, and it would be a real tragedy if the social services, of which the country was rightly proud, were to overreach themselves merely because this most important question was ignored. He hoped that their reformers, who were numerous, would, like Sir Gwilym, have a look sometimes at the wood as well as at their own particular tree.

Another general question was whether they were getting value for their money. Anything that he might have to say on this matter could not be said there, but he was interested in Sir Gwilym's observations, a selection, he supposed, from numerous ruminations. He gathered that in a broad and general way, while conceding that things were not perfect, Sir Gwilym would say that there was good value for money expended. Sir Gwilym was alive to the worship of the bottle of medicine, and similarly there were subtle and unexpected difficulties in most of the other services. But if one were talking of unexpected results, there was another side to the account. He had once heard a doctor say that he attributed to unemployment benefit the comparative absence among children in the depressed areas of diseases due to malnutrition. Certainly the founders of Unemployment Insurance never thought of that.

He would like to thank Sir Gwilym for his kindly references to Unemployment Insurance and its changing satellites. It was pleasant to think that an historian might discern some logic and consecutive thought for which the Ministry of Labour had not so far been given very much credit.

With regard to administration, it was no doubt possible to conceive a better method of control, and that remark applied to the machinery of Government generally. Some would remember a document known as the Haldane Report, and though now out of date, its general approach was interesting and by no means without value at the present time. This, however, was a very tender plant. As in many situations of life, it was desirable to know exactly what one would like to have in order that when the opportunity arose one could grasp it, but the accurate discernment of the opportunity was the all-important matter. It was also worth saying that changes in administration were constantly being made as the need arose, and that the picture ten years hence would be as different from that of to-day as the picture of to-day was different from that of ten years ago.

Mr. Dale said that he had helped Sir Gwilym in his paper to the extent that he had lent him a vanload of illegible *Labour Gazettes.* But he felt most reluctant to be didactic in these matters. There was once a mother who told her daughter that she should not go to dances. "It is all vanity," she said. "I have proved it and I know." The daughter replied, "May I not prove it too?"

Mr. Moss said that, as an outsider, he would have very much hesitated to express any views or comments on the paper, but it seemed to him that Sir Gwilym, who had been kind enough to invite him to the meeting, had gone beyond the sphere of statistics and, as a mere Local Government Officer concerned with the problem of Public Assistance, he would therefore offer a few comments. It seemed to him that the direct administration of social services by the Government tended to be utterly soulless. The recent activities of the Government in relation to Unemployment Assistance showed an improvement, but when an old-age pensioner had fulfilled the statutory requirements, nobody cared an atom what happened to him, unless he could not live on 10*s.* a week and had to go to the local official who, he was sorry to say, was still called the "Relieving Officer." It was not the job of any Government official to take the slightest interest in the applicant beyond paying the sum due. For this reason he thought the Government administration of social services should get more assistance from local bodies such as Councils of Social Service; they had not finished their job when they had given an applicant financial help. This seemed to him one great difference between the administration of a social service by a Government Department and a Local Government Department.

Sir Gwilym had referred to overlapping: much of this could be remedied by Local Authorities themselves. The Government and Local Authorities ought to make more use of voluntary workers in social service administration.

Dr. Rhodes said that in Table I (Appendix) there were certain figures which Sir Gwilym himself had referred to in the body of the paper, concerning which false impressions might be conveyed, especially if anyone wished to make any comparisons over a number of years.

In the grand total the figure for 1935 was £426·8 mn. Sir Gwilym referred to that as consisting of £308 mn., which were contributed by the Public Funds, but over £100 mn. came from contributions, rents, and so on. Anyone looking at the table in a general way would perhaps tend to get the impression that the changes which had taken place in contributions from Public Funds over a period of time, were those changes recorded in column 20 of the Table. He had been sufficiently curious to look up the available figures, and apparently the figure corresponding to £308 mn. in 1935 was £234 mn. in 1920. The increase in the amount from the public funds had been about 30 per cent. since 1920.

The increase in the contributions from the beneficiaries was much greater, in 1920 the amount was £42 mn., and last year was £127 mn.

Table I would be improved if the last total in column 20 were split up into two parts, as Sir Gwilym actually divided the figures for the last year in Table II. It would be preferable if there were tables corresponding to Table II for all the years.

Sir Gwilym commented on the fact that 9 per cent. of the national income became expenditure on the social services from Public Funds. That 9 per cent. might appear to be rather a small amount when related to 100 per cent., but, as had been mentioned, it ought perhaps to be related to other similarly small percentages: for instance, the percentage which the national debt took out of the national income. Or we may say, the national debt was in the neighbourhood of £250 mn. a year at the present time, and the defence services in the neighbourhood of £200 mn. After that, consider the total amount spent in rent by the community at large, say £250 mn., and the total amount spent in living, for food, clothing and so on, say, something like £2,000 mn. The cost of the public social services perhaps ought to be considered as a bigger percentage of a smaller sum—the amount of the national income left after paying for the national debt, defence, housing and living.

DR. C. O. GEORGE, after expressing his deep appreciation of the paper, said he was particularly interested in three closely related points. First, he wished Sir Gwilym had developed his argument that "expenditures on the several services are now determined largely by sectional pressures, and there is a case for more systematic means for settling claims from the standpoint of the community as a whole." Here was clearly one of the crucial problems of public finance. When one found an eminent economist and Labour leader like Dr. Dalton claiming that the fundamental principle of public finance was that of Maximum Social Advantage, and an Italian economist claiming that the same principle was the basis of Fascism, while other political parties would make a similar claim, one realized some of the difficulties involved.

The second problem, touched on by previous speakers, was how much could or should be spent on social services. The former was bound up with the much-discussed question of so-called taxable capacity; as to the latter—how much should be so spent—different people had different opinions, all largely based on non-rational factors. The difficulties inherent in these problems and in that of defining social services were emphasized in the case of a country like Russia, where the Government claimed to bring into the Budget 99 per cent. of the total national income. In all cases, whatever influence economic factors might have, the immediately decisive factor in public finance appeared to be the political factor.

This, said Dr. George, brought him to his third and last point. He wondered if the figures in Table I would be more significant if contributions (other than employers') were deducted, seeing that net benefit to the electorate seemed to be an important factor in the present trend and future development of social services. How were the social services likely to develop? Here one might seek the aid of abstract theory. If it could be assumed (1) that, in the long run, there was only one really effective principle in Government finance, that of securing and maintaining political support (broadly, in taxation to minimize political opposition, in expenditure to maximize political support); (2) an effective representative democracy; (3) enlightened self-interest in the electorate; then, given certain obvious conditions, it seemed inevitable in the long run that while taxation of the majority would tend to decrease or to become more and more indirect, on the other hand, expenditure on the majority would tend to increase and to become more and more direct. It would therefore be interesting if expenditure in Table I and Appendix Tables I and II were divided into direct and indirect (or varying degrees of directness) on analogous lines to the old rough division of taxation into direct and indirect, for it seemed that this might provide some support for the result suggested by theory.

Dr. George concluded by expressing the debt students of public finance would owe to Sir Gwilym for the valuable material he had placed at their disposal.

DR. ISSERLIS wished to emphasize the point of view already expressed by Professor Richardson and Dr. Rhodes, that it was important to have it on record that these tables of expenditure from public funds on social services were such that their contents had to be very cautiously interpreted. Did the increase mean any more than an increase in the proportion of the expenditure of an individual's total remuneration withdrawn from his individual discretion? In the Middle Ages the villager was expected to train himself at his own expense and to provide himself, also at his own expense, with the long-bow which would be used in national defence. Perhaps in the proper interpretation of social services, total expenditure on national defence should be included, instead of excluding war pensions. To illustrate some of the details, he was getting old enough now to be able to recall matters which were perhaps outside the cognizance of some of the Society's younger members. In the late nineties, there was no public provision for unemployment, but the unemployed did live. The ordinary worker considered that there were busy periods and slack periods. In the slack periods he earned very little, or nothing, but he managed to live, by the help of the local butcher, grocer and baker: provision from the busy season for the slack season was made, but it was made either by the individual himself or by a very narrow circle in which he was placed, and possibly the local tradesmen allowed for the fact that some of the unemployed whom they were tiding over the slack season would never be in a position to pay the debt, and covered themselves by a small margin charged to all their customers all the time.

These increases in the social services, apart from the statistical difficulty of the tables (Table I needed two or three pages of footnotes in small print), really represented a removal of spending of earnings from the discretion of the individual.

MR. RAMSBOTTOM desired to add his tribute for this most interesting and stimulating paper, and the care and enormous amount of labour that had obviously gone into its preparation. It would long be a valuable work of reference for those interested in the social services, and for that reason he ventured to make one or two suggestions on points of detail.

On page 501, in the section dealing with "The Burden on Industry," Sir Gwilym had made a percentage comparison between the amount of contributions, 3*s*. 2*d*., paid by the adult workman and his employer, and average weekly earnings, and for that purpose he had compared the figure of 3*s*. 2*d*. with average earnings of 50*s*. to 55*s*. a week. Mr. Ramsbottom would suggest that these figures of earnings were too low. As average earnings of all wage-earners, including men, women, boys and girls, he would have no comment on them, but as the 3*s*. 2*d*. related to an adult man, the comparison should be with the earnings of an adult man, and he would suggest that the figure to be taken for that purpose should be in the region of 65*s*. a week. Incidentally, it might be worth while to insert a note that the 3*s*. 2*d*. applied to workers in industry and commerce, and not to agricultural workers, whose unemployment insurance contributions were only one-half those of the industrial workers.

On the same page, reference was made to calculations published in 1926 as to the relative costs of the social services in Great Britain and certain other countries. It was stated in the paper that the value of these comparisons was doubtful, and he would agree that even at that time they were largely speculative. It was desirable, however, that readers of the paper should also be warned that these figures were not valid for the present time. In Germany, for example, the joint contributions of employers and workers to unemployment and health insurance, old age pensions, etc. at the present time represent probably at least 15 per cent. of average earnings, as against about 5 per cent. in Great Britain, to which there is added, in Great Britain, a Government contribution equivalent to one-half of the 5 per cent. It was clear that the figure of 37*s*. 6*d*. a head quoted for Germany in 1926 would now be greatly increased. Sir Gwilym had perhaps been unduly severe on the International Labour Office Committee, which considered this question a few years ago. Their conclusion really meant that an attempt to make international comparisons on the basis of the inadequate information then available would inevitably lead to wrong conclusions, and that the information which would be required for satisfactory comparisons could not, in fact, be obtained.

Sir Gwilym had referred to the *Ministry of Labour Gazette*, and had suggested that some of the statistics might be curtailed or given less frequently. The experience, however, of those responsible for its production was that there was great difficulty in restricting the statistics even within their present limits, owing to the pressure of public demands. Those who would say that a particular table was not required, or might be produced at less frequent intervals would be surprised by the amount of correspondence and protest which followed experiments in this direction. In that connection it would be recalled that when the Ministry of Labour decided to publish unemployment statistics monthly instead of weekly, protests were made at one of the Society's meetings. On the question of the print of the *Ministry of Labour Gazette*, there would be many, including those who had to read the proofs, who would sympathize with Sir Gwilyn in his desire for a larger type. On the other hand, the extra cost of larger type had to be considered in relation to the demands for economy in the public services, and particularly in the publication of statistics, in recent years; the *Ministry of Labour Gazette* was priced at only *6d.* for about 40 printed pages, and that price did not provide a margin to cover increases in costs of production. The question at issue, therefore, was whether economy in the production of Government statistical publications was more important than an attractive "make-up," including the use of type which would not overstrain the eyesight of readers. In the long run it was public demand which decided these matters.

MR. BÜCHI said there was one thing in the speaker's remarks which interested him in particular, and that was the demand for more research. It was almost useless to ask whether they could afford £300 or £400 mn. a year for social services unless they knew, to some extent at least, the incidence of that expenditure.

In the matter of pensions one had to distinguish between pensions which were grants from public funds and those which were, in fact, deferred wages. The incidence of pensions, moreover, differed according as emigration exceeded or was less than immigration. Similar difficulties applied to expenditure on public works, such as housing. Was it certain that the money spent on housing was in fact encouraging house-building on the whole? He felt that he was not alone in thinking that a large amount of that expenditure—or rather the policy which brought it about—had in fact retarded building. Those were instances of the difficulties involved: he did not think that present expenditure in this country, compared with other countries, was too large relatively to the total national income. The question was whether some of the expenditure on social services might not be a waste of money from the national point of view. The right policy should be for statisticians to find out. One knew that sometimes statisticians had the perfect answer—and then political and other interests played havoc with the proposals, but the endeavour should be made, nevertheless.

Mr. Büchi thought some would have to read the paper over and over again, and he hoped that some of the points he had made would also be considered by those who read the paper later on.

SIR GWILYM GIBBON, in reply, said: I should like, first of all, to thank those who have spoken all too kindly of my paper, and as for those who wished for more, if time permitted, I could add very greatly to the list of possible and desirable additions, but believe me, a very great deal of mid-Victorian tight-lacing took place in order to bring this paper within even the present fairly ample proportions. I will certainly consider the various suggestions that have been made, and for the rest I must use the well-recognized formula, "My reply will be given in the *Journal.*"

Sir Gwilym later wrote as follows:—

Sir Harry Haward referred to the increased borrowings by Local Authorities for the social services. Some information on the subject is contained in my paper of last year, "The Expenditure and Revenue of Local Authorities" (*Journal*, Vol. XCIX, Part III, 1936).

I agree with Professor Richardson that care is needed in comparing expenditures for different years when new services have been introduced in the interval, but comparisons of this kind are essential for understanding developments, made, of course, with proper precautions. Allowance must certainly be made for changes in population (composition as well as total), in monetary values, and in national income (the general level for a period rather than that of a particular year, which may be misleading because of exceptional prosperity or depression). As I state in my paper, it is difficult on present information to reach any sound conclusions on the ultimate incidence of insurance contributions, whether of employer or of employed, and I am by no means sure that there is sufficient ground for thinking that the amounts of these contributions, if they had not been levied, would have been "largely available for payment as wages. . . ."

Professor Richardson and others refer to the statement in my paper, "how much a nation can afford to spend on social services will depend largely on the excess of income over that needed for primary necessities and comforts." I still think that in practice this is correct, except that I should have made it clear (as I have now done) that what I had in mind was expenditure from public funds. In this connection, while I fully recognize the element of 'compulsory thrift' in the social services to which Dr. Isserlis refers in other terms, the increase in the expenditure seems to me to mean very much more than "an increase in the proportion of the expenditure of an individual's total remuneration withdrawn from his individual discretion."

Dr. Rhodes suggests that figures similar to those in Table II for the year 1934–35 should be given for all the years in Table I; this has not been done, for lack of space, but I give detailed figures in later tables for certain of the services. It is clearly desirable, as suggested by him, to compare expenditure on the social services not only with the total national income, but also with expenditure on particular items, both public and private. That is why, as one pointer, I mentioned the expenditure on liquor and tobacco. It has been suggested to me that I might have given that on cinemas!

What I had particularly in mind, in the part of my paper quoted by Dr. George, was that the present large number of social services (to some extent competing), the heavy expenditure on these and the inevitable demands for more expenditure render desirable more definite machinery, within the general ministerial and departmental system, for considering policy, expenditure, and administration in the social services as a whole and also, at least in matters of common concern, in the several services. There is the stronger case for this measure because of the influences in public expenditure and taxation to which he refers.

I am obliged to Mr. Ramsbottom for his suggestions on present weekly earnings of adult male wage-earners, and have inserted his figures in a footnote. To avoid misunderstanding, I have added a caution on the present burden of social services in other countries: I had, in fact, hoped to have included in my paper some international comparisons of contributions and benefits, but found that the space could not be afforded.

I am glad that Mr. Buchi stressed the need for research. Until we have much more of it, genuine research, we do not know what value we are receiving for our money, much less what incidental consequences we are incubating—an even more critical issue in the long run.

As a result of the ballot taken during the meeting, the candidates named below were elected Fellows of the Society :—

Samuel Hays, B.Com.
Robert Arthur Mills.
Charles Venn Owen.
Winifred Mary Stone.

Corporate representative.

Betty Fairfax Rushby. *representing* Messrs. Alfred Pemberton Ltd.

SOME RESULTS OF THE IMPORT DUTIES ACT

By H. LEAK

[Read before the ROYAL STATISTICAL SOCIETY, June 15th, 1937, the PRESIDENT, the RT. HON. LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C., in the Chair.]

IN the course of compiling the reports on the Inquiries into production under Section 9 of the Import Duties Act, 1932, it seemed to me that there was material there worthy of analysis in a manner that would not be suitable for inclusion in a Government publication. I am presenting the results of that analysis, not as a Government official, but as a statistician in the fortunate position of having first-hand knowledge of the material on which he is working. Any views expressed or conclusions drawn are my own, and not those of the Department in which I am serving. I trust, however, that the results may be of some value to those concerned in the administration of the Import Duties Act, and of interest to a wider circle.

The subject of what happens when a general tariff is imposed is one which has interested me for a long time. The immediate effect is obviously different in a highly industrialized country like our own and in a country essentially agricultural. In the one case the result may be expected to be a marked restriction of imports and an expansion of home production following the imposition of duties at quite a low level, with possibly little or no rise in internal prices, while in the other, imports may continue to come in with relatively little reduction in volume but with a marked rise in internal prices. The difference between the two results depends upon the capacity of the country concerned to produce the goods. Our importation of tea and tobacco, for example, is not greatly affected by the impositions of the Chancellor of the Exchequer—they are commodities we cannot produce for ourselves, and a change in the duty is reflected in the internal price. The long-term effects in an industrial country are likely to be different, but I do not propose now to speculate on that subject, as my immediate concern is with the effects of the Import Duties Act, 1932, so far as such effects are shown by the trade returns and the reports of the Import Duties Act Inquiries, 1933 and 1934.

The Import Duties Act empowered the Board of Trade to make enquiries into the production of goods of descriptions which, if imported, would be subject to a duty under that Act, and this power was extended by the Finance Act of the following year to cover goods subject to the McKenna duties, the silk duties and the safeguarding of industries duties. This opened a wide field—wider than we could tackle with our limited staff in the time available. When it was decided in 1932 to hold an Inquiry under the Import Duties Act in respect of production in the following year, we had not issued the first of the five volumes containing the report on the 1930 Census of Production.

Having to reduce the number of trades dealt with, it was decided to cut out: (1) trades such as clothing and baking in which there were a large number of firms and the small firms, for which comparative information was not available, formed a substantial proportion of the total; (2) trades such as furniture and stationery in which there was no quantitative information as to output; and (3) repairers and other occupiers of workshops whose output of goods was small, not only in relation to the number of firms but absolutely. By this means, and by not requiring firms to make separate returns for factories in different areas, the number of effective returns to be handled was reduced from 36,700 at the 1930 Census to 21,800. The extent of the production covered in each group of trades is shown in Table I. We were able to obtain comprehensive returns for the Silk and Artificial Silk Trade in each year, notwithstanding that for 1933 firms who manufactured only pure silk and artificial-silk goods were under no obligation to make a return.

In the first part of the table are given comparable figures for the three years in respect of the trades covered by both the 1933 and 1934 Inquiries, apart from the Cycle Trade, which was merged for 1934 in the Motor and Cycle Trade. The principal aggregates for the latter trade and for the other trades covered by the 1934, but not by the 1933 Inquiry, viz. Watch and Clock, Scientific Instruments, Musical Instruments, and Cinematograph Film Printing Trades, are given in the second part of the table, with comparable figures for 1930.

For the factory trades as a whole, and measuring by the average number of persons employed in 1930, the proportion covered by the 1934 Inquiry was about 71 per cent., while of the total for all trades, including the non-factory trades, about one half was covered. The proportion varied considerably from group to group. The Iron and Steel and the Non-ferrous Metals groups were covered completely, and the omitted output in the Textiles, Clay and Building Materials, and Miscellaneous groups was relatively insignificant. On the other hand, the proportion of the Paper, Printing and Stationery group covered was only 15 per cent., Timber 21 per cent., Food, Drink and Tobacco 26 per cent. and Clothing

TABLE I

Summary of Results for 1934, 1933 *and* 1930

Trade group (1)		Gross output (selling value of goods made and value of work done) (2)	Cost of materials used and amount paid for work given out (3)	Net output (excess of col (2) over col. (3)) * (4)	Average numbers of persons employed (except outworkers) (5)	Net output per person employed (6)
		£'000	£'000	£'000	No.	£
Factory Trades included in both 1934 and 1933 :—						
Iron and Steel	1934	250,427	147,439	102,988	498,601	207
	1933	201,637	117,046	84,591	445,770	190
	1930	237,906	146,014	91,892	494,295	186
Engineering, Shipbuilding and Vehicles	1934	239,902	105,891	134,011	613,361	218
	1933	191,097	82,353	108,744	540,646	201
	1930	252,111	114,284	137,827	641,979	215
	(a)	98,845	52,525	46,320	236,882	196
Non-Ferrous Metals	1934	98,665	72,454	26,211	107,883	243
	1933	85,718	63,510	22,208	97,214	228
	1930	75,135	51,726	23,409	107,153	218
Textiles	1934	401,609	251,562	147,880	1,025,926	144
	1933	383,700	237,094	143,456	1,009,618	142
	1930	413,476	266,737	145,139	1,045,140	139
	(a)	19,917	17,279	2,638	17,746	149
Leather	1934	28,287	19,169	9,118	45,165	202
	1933	27,955	18,900	9,055	43,703	207
	1930	32,705	23,100	9,605	43,378	221
	(a)	3,312	2,737	575	2,768	208
Clothing	1934	51,462	28,061	23,401	154,414	152
	1933	51,986	28,464	23,522	155,061	152
	1930	62,063	35,610	26,453	158,082	167
	(a)	118,318	66,676	51,642	333,688	155
Food, Drink and Tobacco	1934	138,221	93,824	44,397	138,216	321
	1933	134,428	91,342	43,086	133,735	322
	1930	152,086	112,788	39,298	123,917	317
	(a)	511,861	290,434	148,907	349,566	426
Chemicals, etc.	1934	159,456	83,076	75,650	174,134	434
	1933	153,288	82,697	69,781	165,107	423
	1930	161,172	94,466	65,566	167,719	391
	(a)	20,351	9,082	7,199	9,643	747
Paper, Printing and Stationery	1934	41,917	24,740	17,177	63,609	270
	1933	36,580	21,112	15,468	58,559	264
	1930	40,180	25,504	14,676	57,527	255
	(a)	137,193	48,480	88,633	322,476	275

TABLE I—*continued*

Trade group (1)		Gross output (selling value of goods made and value of work done) (2)	Cost of materials used and amount paid for work given out (3)	Net output (excess of col. (2) over col. (3))* (4)	Average numbers of persons employed (except outworkers) (5)	Net output per person employed (6)
		£'000	£'000	£'000	No.	£
Timber	1934	17,756	11,489	6,267	34,317	183
	1933	16,399	10,510	5,889	32,449	181
	1930	17,963	11,460	6,503	35,312	184
	(a)	50,745	25,783	24,962	132,500	188
Clay and Building Materials	1934	75,293	27,503	47,790	230,207	208
	1933	66,490	24,078	42,412	211,137	201
	1930	70,591	26,204	44,387	221,452	200
	(a)	1,209	495	714	3,064	233
Miscellaneous	1934	67,805	36,127	31,678	131,035	242
	1933	59,056	30,538	28,518	122,762	232
	1930	68,118	38,681	29,437	123,672	238
	(a)	1,568	1,022	546	2,859	191
Total	1934	1,570,800	901,335	666,568	3,216,868	207
	1933	1,408,334	807,644	596,730	3,015,761	198
	1930	1,583,506	946,574	634,192	3,219,626	197
	(a)	963,319	514,513	372,136	1,411,192	264
Factory Trades not covered in 1933 :—						
Engineering and Vehicles	1934	117,129	69,429	47,700	200,638	238
	1930	109,697	64,317	45,380	195,281	232
Non-Ferrous Metals	1934	922	441	481	2,861	168
	1930	855	406	449	2,354	191
Miscellaneous	1934	15,852	6,921	8,931	37,925	235
	1930	22,182	9,247	12,935	47,545	272
Total	1934	133,903	76,791	57,112	241,424	237
	1930	132,734	73,970	58,764	245,180	240
Non-Factory Trades	(a)	695,115	254,826	440,289	2,265,875	194
TOTAL—ALL TRADES	1934	1,704.703	978,126	723,680	3.458,292	209
	1930	1,716,240	1,020.544	692.956	3,464.806	200
	(a)	1,658,434	769,339	812,425	3,677,067	221

* Excluding estimated Excise duty.

(a) Aggregates recorded at the 1930 Census in respect of trades and businesses omitted from the 1934 Inquiry.

32 per cent. The output recorded in the Engineering, Shipbuilding and Vehicles group is deficient essentially only by the output of shipbuilding and marine engineering firms, these being omitted by reason of the special position of ships under the Act. In future Inquiries it is proposed to include marine engineering; but ships being in the main not subject to duty under the Import Duties Act, it will only be possible to obtain particulars of their output at the quinquennial Census of Production.

VOLUME OF PRODUCTION

The volume of production has been calculated for each trade, the quantities of the various descriptions of goods produced in each year being revalued at the average values of the year 1930. This method is not very precise, especially for the year 1924, when it was only found possible to collect quantitative information as to output for a much smaller range of goods than has been practicable in more recent years. For a good many trades, however, quantitative information is available in sufficient detail to justify some reliance being placed on the results. In this connection the problem of duplication is important. In a number of trades, the output of one firm in the trade forms the material of another, and the output of the second firm may therefore duplicate that of the first. In so far as this happens to the same extent in each year, the accuracy of the volume of production calculation is not affected. In connection with the 1930 Census of Production the question of changes between 1924 and 1930 in the amount of duplication was looked into for all the principal trades, and the results were published in the Final Report on the Census. Subsequent to 1930 there is no reason for thinking that there was any substantial change in the amount of duplication. In some cases the production figures for 1933 and 1934 may not be so complete as those for 1930, owing to the Import Duties Act Inquiries not covering all trades—so that the secondary output of the firms in the excluded trades, which might have been principal products of the trades included, was not ascertained—and to the omission of workshops, *i.e.* firms employing no power plant. These omissions are, however, believed to be negligible in relation to any of the aggregates presented in this paper.

In aggregating the index numbers showing the volume of production in each trade relative to 1930, the net output in the year 1934 has been used. For many of the Textile Trades in particular net output in 1930 was much affected by the decline in prices, which affected particular trades unequally, and the distribution of net output between the various trades was somewhat abnormal in that year. The year 1934 was more normal, though 1935 would be better still if the final results for that year were available. Since silk and artificial silk goods were dutiable prior to the passing of the Import Duties Act, and that Act affected only certain mixed tissues in 1933 and 1934, the Silk and Artificial Silk Trade has been omitted from the calculation of the aggregate volume of production; this otherwise covers the whole of the trades included within the scope of both the 1933 and the 1934 Inquiry, apart from the Cycle Trade, which was a separate trade in 1933, but was combined with the Motor Trade in other years. Details in respect of all the trades in which more than 10,000 persons were employed in 1934 are given in Appendix I. The following table shows the aggregate volume of production in each trade group in 1924, 1933 and 1934 relative to 1930, together with the net output in 1934, with totals for textiles, metals and miscellaneous.

TABLE II

Volume of Production

Trade group	1924	1930	1933	1934	Net output in 1934
					£'000
Textiles *	132	100	118	121	135,024
Iron and Steel	99	100	99	117	102,988
Engineering and Vehicles ...	88	100	84	104	134,011
Non-Ferrous Metals	100	100	97	113	26,211
Total—Metal Trades	93	100	91	110	263,210
Leather and Clothing	96	100	106	107	32,519
Food	85	100	116	125	44,397
Chemicals, etc.	92	100	113	122	75,650
Timber and Paper...	84	100	109	122	23,444
Clay and Building Materials ...	86	100	104	122	47,790
Miscellaneous	85	100	113	126	31,678
Total—Miscellaneous Trades ..	89	100	110	121	255,478
TOTAL	99	100	103	116	653,712

* The output of firms in the Silk and Artificial Silk Trade is omitted.

The above trades show, in the aggregate, a rise of 1 per cent. in the volume of production between 1924 and 1930, a rise of 3 per cent. in 1933, and a very substantial rise of 12½ per cent. between 1933 and 1934. The increase of 1 per cent. for these trades between 1924 and 1930 may be compared with an increase of some 7 per cent. for the whole of the Factory Trades, the latter figure including an allowance for duplication, as does the former. Reasons for this wide difference are the inclusion of substantially the whole of the Textile Trades within the scope of the Inquiries, and the omission of the Motor Trade, the Silk and Artificial Silk Trade, and the greater part of the Timber and the Printing and Stationery Trades, all of which showed large increases between 1924 and 1930.

The greater relative importance of the Textile Trades in the Inquiries as distinct from the Census of Production has a major influence, since alone among the groups of trades shown in Table II the volume of production of firms engaged in the manufacture of textiles was smaller in 1930 than in 1924. The decline was nearly one quarter. Subsequently production increased, and had risen by 1934 to about 8 per cent. below the 1924 figure. The increase between 1933 and 1934 was under 3 per cent.

In the Metal Trades there was a rise of some 8 per cent. between 1924 and 1930: but production had fallen by 1933 to below the 1924 figure, mainly owing to a decline in Mechanical Engineering. There was, however, a very rapid recovery in the following year, production in 1934 being over 18 per cent. greater than ten years earlier and 21 per cent. more than in 1933. The expansion relative to 1933 was general apart from the Tinplate Trade.

In the remaining trades the figures indicate continuous expansion in the aggregate, there being a rise of 12 per cent. between 1924 and 1930, and of 10 per cent. between 1930 and 1933 and between 1933 and 1934, and the total increase of 36 per cent. over the ten years was much larger than for the Metal Trades. The trend of all the separate groups of trades included in this total was similar, the expansion between 1924 and 1934 exceeding 45 per cent. for the Food, Timber and Paper Trades included within the scope of the Inquiries and for the group of Miscellaneous Trades. The increase between 1933 and 1934 was particularly marked in the Clay and Building Materials group.

CHANGES IN EFFECTIVE OUTPUT

For the purpose of calculating the volume of output per person employed, the re-valued output has been divided by the average number of persons employed in each year, and after allowing for any known changes in the extent of duplication, the resulting figures have been expressed as index numbers with 1930 as base. These index numbers are given in Appendix II for each trade employing more than 10,000 persons in 1934 for which quantitative particulars are available. The trades omitted from the Appendix are Electrical Engineering, Finished Brass, Tool and Implement, Fancy Articles, Leather Goods and Lace, together with the Scientific Instruments and Musical Instruments Trades, which were not included in the 1933 Inquiry.

Several methods of aggregating the results presented themselves, but the method adopted has been to multiply the index numbers for the volume of output per person employed by the number of persons employed in the year in question in each trade, and divide the result by the aggregate number of persons employed in that year in all trades in the group. For the three groups Textiles, Metals and Miscellaneous, and for the grand aggregate, the results are given below. The trades not covered by the Import Duties Act Inquiry for 1933 as well as the Silk and Artificial Silk Trade have been omitted in compiling these aggregates.

TABLE III

Volume of Output per Person Employed

Trade group	1924	1930	1933	1934
Textiles	109	100	125	128
Metals	97	100	104	112
Miscellaneous	92	100	111	115
Total	100	100	113	118

The increase in effective output over the ten years 1924–34 is very striking, amounting for the aggregate of all trades considered to 18 per cent. For the Textile Trades it was 18 per cent., for the Metal Trades 16 per cent., and for other trades 25 per cent. The increase in output per person employed was continuous in the metals and miscellaneous groups, but for the textile group the very abnormal conditions prevailing in 1930 resulted in a decline. In that year it will be remembered that there was such a marked slump in the cotton trade that output, as measured by the quantity of raw cotton delivered to mills, was under three-quarters of that in 1929. Short time was worked throughout the year, not only in the Cotton Trade, but also in all other textile trades, with the result that the number of employees on the books did not decline so rapidly as output, and this factor was sufficient to offset any factors leading to an increase in the effective output per person employed.

For only two of the nine textile trades shown in Appendix II was there any increase between 1924 and 1930 in the volume of output per person employed. The outstanding increase was that recorded for Silk and Artificial Silk; the rise between 1924 and 1930 was some 13 per cent.—a definite under-statement of the improvement in technical efficiency between those years, as is indicated by the figure for 1934 being more than double that for 1924. The other trade in which there was an increase in output per head between 1924 and 1930 was the Linen and Hemp Trade, and both the Northern

Ireland and the Scottish sections of the trade showed increases, in the aggregate about 10 per cent., notwithstanding that short time in 1930 was more prevalent than in 1924. Between 1924 and 1934 this trade showed an increase of about 40 per cent. in output per person employed. The only other increase between 1924 and 1934 which exceeded 30 per cent. was recorded for the Jute Trade. The smallest increase was about 6 per cent. for both divisions of the Cotton Trade. All the textile trades except the Woollen and Worsted Trade showed an increase between 1933 and 1934, and the decline for that trade may be attributed to employment rising rapidly in 1933 with rising prices, with the result that when a break in prices took place early in 1934, there was a greater reduction in output than in employment.

In the metals group, the position as shown for the Textile Trades is reversed, only three of the seventeen important trades in this group having a lower output per head in 1930 than in 1924. In one of these—the Tinplate Trade—practically no change is shown as having taken place between any of the years 1924, 1930, 1933 and 1934. There was also not a very large change for Iron and Steel Foundries, the increase between 1924 and 1934 being only 6 per cent. The largest decline between 1924 and 1930 was 8 per cent. for the Railway Carriage and Wagon-Building Trade, employees not being discharged as rapidly as work diminished.

For the firms engaged in the smelting and rolling of non-ferrous metals except copper and brass and in the manufacture of aircraft, a higher output per person employed was recorded for 1930 than for any of the other three years, though in the former trade there was an increase of 12 per cent. between 1924 and 1930 and comparatively little change subsequently. For the Aircraft Trade the rise between 1924 and 1930 was about 70 per cent., and there appears to have been a decline subsequently. The latter was due, in part at any rate, to measurement having to be made by number, and changes in types of aircraft produced may have rendered the measurement inaccurate—an Imperial Airways passenger liner and a Puss Moth would equally be counted as one. The relatively small increase of only 9 per cent. between 1924 and 1934 was recorded for Mechanical Engineering. The corresponding rise for Electrical Engineering, not shown in the Appendix owing to the absence of any precise method of measurement, was about 20 per cent. In the Motor Trade and the Cutlery Trade persons employed in 1934 are recorded as producing twice as much each as those employed ten years earlier. The steady rise of 55 per cent. over the ten years for the Wrought Iron and Steel Trade may be noted, as also the increase of 46 per cent. for Blast Furnaces and 43 per cent. for the Wire Trade. The increases for the Hardware, Hollow-ware, Metallic Furniture and Sheet Metal Trades and the Plate and Jewellery Trade were equally steady, but not so large.

Among the remaining trades shown in the Appendix, output per head was higher in 1930 than in 1924 in seventeen trades, lower in four trades and similar in one trade. The largest decrease was one of 9 per cent. for the China and Earthenware Trade, but the basis of measurement in this trade is somewhat less precise than in most other trades, and the decline may have been less than is indicated by the published figures—there was some increase in short-time working in 1930. Outstanding increases between 1924 and 1930 were recorded for persons engaged in the manufacture of cement and in the Rubber Trade; over the period 1924–34 output per head doubled in the former trade and increased by over one-half in the latter, while that of persons employed in the manufacture of metallurgical coke increased by nearly one half. Increases of the order of 40 per cent. between 1924 and 1934 were recorded for the Butter, Cheese, etc., Trade, the Chemicals, Dyestuffs and Drugs Trades, the Linoleum Trade and the Paper Trade. The Leather (Tanning and Dressing) Trade was the only trade in which no increase in output per person was shown over the ten years, and here the figures for each of the four years were practically identical; the increase in the China and Earthenware Trade was insignificant. Apart from the Leather (Tanning and Dressing) Trade, already mentioned, the only one of the Miscellaneous Trades in which output per head was less in 1934 than in 1933 was the Boot and Shoe Trade, output being affected in 1934 by an increase in short-time working. Steady and substantial increases over the ten years were recorded for the Brick and Fireclay Trade, Paper Trade, Preserved Foods Trade, Hat and Cap Trade, Soap, Candle and Perfumery Trade, and Brush Trade, in addition to five trades already mentioned, viz., Cement, Rubber, Coke Ovens, Chemicals, etc., and Butter, Cheese, etc.

THE EFFECT OF THE TARIFF ON IMPORTS

Having dealt in the preceding sections with a few of the results shown by the particulars obtained from manufacturers at the Import Duties Act Inquiries, I turn now to the statistics of external trade with which those of production are compared. The base year is 1930, and the question which first arises is whether that year furnishes a sound base for the purpose of comparison. Exports and production were very much on the downgrade in that year, and neither can be said to be truly representative of the pre-tariff period, though the abnormality regarding the volume of exports was much greater than that of the volume of production, averaged over the whole year. The index of production, which the Census of Production results showed to have represented accurately the trades it covered, in the aggregate though not the aggregate of all trades, indicated that production in 1930 was some 8 per cent. less than in 1929 and 2 per cent. less than in 1928. Exports in 1930 were smaller in volume than in any of the preceding six years and over 18 per cent. less than in 1929, but subsequently exports have been less than in 1930, so that 1930 stands mid-way between the good years and the bad years for exports. The decline in production in 1930 resulted to a very large extent from the decline in exports, and in the aggregate 1930 was probably not an abnormal year so far as production of goods for the home market was concerned.

What of imports? Are we likely to be misled in estimating the effect of the tariff on imports by taking 1930 as the base year? On the whole, I think not. The volume of retained imports of articles wholly or mainly manufactured—it is these which in the main have to be compared with our production—was the same in 1930 as in 1929 and about 5 per cent. higher than in 1927 and 1928. Deducting the following goods dutiable under other enactments—hydrocarbon oils, silk and artificial silk, motor cars, watches and clocks, scientific and musical instruments, cinematograph films and matches, and the goods dutiable under the Safeguarding of Industries Act—the volume of imports of manufactures in 1930 was between 1 and 2 per cent. less than in 1929 and some 3 per cent. higher than in 1927 and 1928. I feel some confidence, therefore, in regarding 1930 as a normal year for imports of manufactures. In the aggregate it would only make about 2 per cent. difference if the volume of imports were averaged over the four years 1927–30, though for particular classes of goods the difference would be considerably larger.

In the various tables up to and including No. XII goods are classified according to the ad valorem rates of duty in force on 1st January, 1934. Specific rates have been converted to ad valorem rates by estimating, as closely as the available data permit, the approximate amount of duty that would have been payable on the goods imported in 1933 and 1934 from foreign countries, and expressing this as a proportion of the declared values. The information available in Volume II of the *Annual Statement of Trade* is not sufficient to enable this to be done with precision, as the value of individual classes of goods entered for home consumption is not given when duty is charged at a specific rate.

Table IV summarizes the position as regards total imports in 1930, 1933 and 1934 of manufactured articles of descriptions which were not dutiable in 1930, and which are dutiable only under the Import Duties Act or have been exempted from the general ad valorem duty (*i.e.*, essentially certain non-ferrous metals, calcium carbide, potassium compounds, finished dyestuffs, natural essential oils, and newsprint). The table relates to goods for which quantitative particulars are readily available; the goods omitted are those recorded by value only, together with some small miscellaneous items, whose omission would not affect the figures to any appreciable extent. The goods imported in 1933 and 1934 have been re-valued at the average values of goods of the same descriptions imported in 1930, and the proportions which the 1933 and 1934 aggregates represent of the 1930 total are given in the table. Retained imports have been taken if the re-export trade is of importance, and these re-exports have been valued at the same average value as imports, to avoid the distortion which might arise if, in 1930, average values were very different for imports and re-exports. The size of the various groups is indicated by the 1930 figures.

TABLE IV

Manufactures dutiable only under the Import Duties Act*

Rate of duty	Value of imports from all countries in 1930	Volume of imports relative to 1930	
		1933	1934
Per cent.	£ mill.	Per cent.	Per cent.
0	17·5	97	143
10	38·9	68	77
15	12·1	80	91
20	57·9	41	48
25	6·6	59	66
30	4·3	44	52
33⅓	17·0	36	53
Over 33⅓	1·8	90	48
Total	156·1	58	71

* Goods classed as articles wholly or mainly manufactured, *i.e.* not including manufactured foods.

The reduction in imports in 1933 relative to 1930 does not vary at all evenly according to the rate of duty imposed, and Table V shows the results analysed into three classes: textiles, metals and miscellaneous. The increase in imports in 1934 was general apart from the goods dutiable at specific rates whose ad valorem incidence was greater than 33⅓ per cent. These consist of screws for wood and rubber boots and shoes, and the reason for the high figure for 1933 and much lower figure for 1934 is that the duty on rubber boots and shoes, which approximated to 60 per cent. ad valorem, was not imposed until 2nd May, 1933. Previously rubber boots and shoes had been dutiable at a mixed rate of duty approximating to 30 per cent. ad valorem.

The textiles group given below includes the following groups in the trade classification:—cotton, wool and "other textile" yarns and manufactures, together with the apparel group except boots and shoes. Metals include iron and steel, non-ferrous metals, cutlery, hardware, etc., and machinery. The other groups in the trade classification except vehicles are included in the miscellaneous group. Imports in the vehicles group consist essentially of motors and parts which are excluded from the survey as being dutiable under other enactments.

TABLE V

Imports at 1930 *Prices*

Rate of duty	Textiles*			Metals			Miscellaneous		
	1930	1933	1934	1930	1933	1934	1930	1933	1934
Per cent.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.
0	—	—	—	9·8	9·4	16·7	7·7	7·6	8·4
10	6·2	1·0	1·0	15·0	10·7	13·4	17·7	14·7	15·5
15	—	—	—	1·2	0·7	0·8	10·9	9·0	10·2
20	23·9	8·4	8·2	20·1	8·2	11·4	13·9	7·3	8·4
25	4·7	2·7	3·5	—	—	—	1·9	1·2	0·9
30	2·1	1·2	1·4	0·8	0·2	0·3	1·4	0·4	0·5
33⅓	—	—	—	17·0	6·1	9·0	—	—	—
Over 33⅓	—	—	—	0·14	0·05	0·08	1·7	1·6	0·8
Total	36·9	13·3	14·1	64·0	35·3	51·7	55·2	41·8	44·7

* Including apparel of textile materials.

The reduction in imports of textiles between 1930 and 1933 was much greater than for the other two groups, and there was only a 6 per cent. increase in the volume of imports in 1934. This increase was essentially in the goods at the higher rates of duty, and is due to larger imports of carpets, partly from India, and of hats and caps. The latter (dutiable at 30 per cent., except for bodies of wool and fur felt dutiable at 25 per cent. and certain hat shapes dutiable at 20 per cent.) * were imported in 1934 to nearly the same extent as in 1930, and there was not a very great reduction in 1933. There was an increase of 10 per cent. in the duty on hats and 5 per cent. on bodies at the end of June 1933. Average values of imports of nearly all descriptions of hats and caps fell sharply between 1933 and

---

* As the statistical classification in 1933 did not provide for the new tariff headings, certain descriptions which can be identified have been included against the 30 per cent. heading in the table and the remainder at 25 per cent., that being the average incidence of the duty on them in 1934.

1934, while there was no substantial change in average values of most descriptions of hats and caps produced in this country. There had also been a very marked fall in average values of imports between 1930 and 1933 and it is probable that in this instance the foreign exporter reduced his prices as duties were raised, and thereby maintained his sales, though an increased proportion of the cheaper goods included under each description may account for some of the changes in average values. The fact that the volume of home production, which in 1930 was three times that of imports, rose to four times that of imports in 1934 shows that the home manufacturer benefited from the protection afforded by securing that increase in home trade which might otherwise have gone to the foreigner.

Included in the above table are imports of textiles from British countries aggregating about £5 million in 1930, £4½ million in 1933 and £5 million in 1934. Imports of textiles from foreign countries therefore amounted, at 1930 average values, to roughly £32 million, £9 million and £9½ million in the three years.

In the metals group the volume of imports in 1933 was 55 per cent. of that in 1930; in the following year the proportion rose to 81 per cent. The rise in 1934 was general, but was largest in the non-ferrous metals admitted free of duty. Omitting these, the proportions become 48 per cent. of the 1930 figure in 1933 and 65 per cent. in 1934, comparing with 36 and 38 per cent. for textiles in the two years. Though there are imports from British countries of goods dutiable at each of the rates of duty, such imports are of importance only in relation to imports at 10 per cent., where at 1930 average values they amounted to £5·3 million, £8·4 million and £9·6 million in 1930, 1933 and 1934, respectively. The corresponding aggregates for all rates of duty from 10 per cent. upwards are about £7 million, £11 million and £13 million. Deducting the aggregate goods imported free of duty, apart from machinery licensed for free importation and goods consigned to shipbuilding yards, for which no corresponding data for 1930 exist (these imports aggregated about £2·0 million in 1933 and £2·6 million in 1934), the totals for metals become about £47 million in 1930, £15 million in 1933 and £22 million in 1934.

The goods dutiable at 33⅓ per cent. comprise crude and semi-finished manufactures of iron and steel, most of the finished iron and steel goods being dutiable at 20 per cent. and some at lower rates. Imports are small in relation to production, and if the production aggregates given in a later table had been based on the total production, instead of on that part of the total which was sold, the proportion of imports to production would be much smaller. Taking the figures as they stand, they show that in 1930 imports of metal goods were roughly 20 per cent. of production, in 1933 12½ per cent. and in 1934 15 per cent., imports taking some share in the substantial expansion in the home market in 1934.

In the miscellaneous group, imports declined in volume between 1930 and 1933 by 24 per cent., and the increase in 1934 was to a figure 19 per cent. below 1930. The reduction in imports in this group was accordingly much less than for either textiles or metals. Omitting goods exempted from the general ad valorem duty, the proportion of the 1930 imports which was imported in 1933 and 1934 becomes 72 and 76 per cent., respectively. Imports from British countries are important in relation to the aggregates for miscellaneous goods exempt from duty (newsprint in particular), for goods dutiable at 10 per cent. (undressed leather was about £4 million in each year) and for rubber boots and shoes dutiable at about 60 per cent. Deducting these latter imports, the value of the imports of rubber boots and shoes from foreign countries at 1930 prices becomes £1·5 million in 1930, £1·1 million in 1933 and only £0·2 million in 1934, indicating very clearly the great reduction in imports from foreign countries consequent upon raising the rate of duty from about 30 to about 60 per cent. ad valorem. In the aggregate, imports of miscellaneous manufactures from British countries were about £9 million, £9½ million and £10½ million in 1930, 1933 and 1934, respectively, and deducting these and the goods exempt from duty, the totals of imports from foreign countries become £42 million in 1930, £28 million in 1933 and £29½ million in 1934.

The only declines recorded in 1934 for miscellaneous goods at the various rates of duty were in respect of rubber boots and shoes, and goods dutiable at 25 per cent. The latter resulted from there being a substantial reduction in imports of glue, gelatine and size following an increase in the duty from 10 per cent. to about 25 per cent. at the beginning of August 1933. The greatest restriction of imports of miscellaneous goods, whether in 1933 or 1934, was in goods dutiable at 30 per cent., comprising mainly perfumery, cosmetics and toilet preparations. This appears to be a case of a prohibitive duty imposed on luxury goods, but it resulted in a quite unnecessary degree of protection in a rapidly expanding home market. The home production of these was four times as great as the imports in 1930, and it doubled between 1930 and 1934. To some extent—and this applies probably in lesser degree to other manufactures—the rise in home production between 1930 and 1934 was due to the establishment in this country of branches of foreign firms as a result of the tariff, but omitting such firms the increase in the production of these goods by firms already established was about 85 per cent. between 1930 and 1934.

Taking all these groups together the totals for imports at 1930 prices of manufactures dutiable only under the Import Duties Act may be divided as follows :—

—	1930	1933	1934
	£ mill.	£ mill.	£ mill.
Goods exempt from duty*	17½	17	25
Other goods imported from :—			
British countries	18	21½	24½
Foreign countries	120½	52	61
Total	156	90½	110½

* Not including machinery licensed for free importation and goods consigned to shipbuilding yards.

The table shows an increase of some 20 per cent. between 1930 and 1933 in imports of dutiable goods from British countries and a decline of 57 per cent. in imports from foreign countries. Home production of these goods increased by 6 per cent. between 1930 and 1933, so that the tariff would appear up to 1933 to have benefited the Dominion manufacturer to a greater degree than the home manufacturer. This continued in 1934, when, relative to 1933, imports of dutiable goods from British countries increased by about 14 per cent., while home production increased by 11 per cent., the corresponding increases in relation to 1930 being 36 and 18 per cent.

The restrictive effect of the tariff on imports is more apparent if these are divided into the three classes. The proportions given below relate to imports from foreign countries only.

Table VI

Reduction of Volume of Imports from Foreign Countries relative to 1930

Rate of duty	1933			1934		
	Textiles *	Metals	Miscellaneous	Textiles *	Metals	Miscellaneous
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Exempt from duty	—	46	4	—	(+)14	(+) 7
10 per cent. ...	86	88	25	85	73	23
15 per cent. ...	—	34	18	—	21	6
20 per cent. ...	74	60	49	76	45	41
25 per cent. ...	57	—	37	48	—	52
30 per cent. ...	41	70	68	32	63	64
33⅓ per cent. ...	—	66	—	—	51	—
Over 33⅓ per cent.	—	66	18	—	42	87
Total	72	65	30	71	44	26

* Including apparel of textile materials.

The figures in this table show a greater degree of uniformity than do those for aggregate imports of dutiable goods from all countries shown in Table IV. There are several anomalous figures. Textiles run in the reverse order from what might be expected, thanks to the abnormal movement for hats and caps already referred to, and to the effectiveness of a 10 per cent. duty in cutting off imports of yarns. That for metals dutiable at 10 per cent. results from certain non-ferrous metals and manufactures formerly imported from foreign countries being imported from British countries with some absolute decline in imports. The 1934 figures for miscellaneous manufactures are in regular progression, apart from that for goods dutiable at 15 per cent. This group includes certain descriptions of paper and board (not packing and wrapping paper), imports of which were larger in 1933 than in 1930—sharing in the general prosperity of that industry—and in common with other goods there was a further expansion in 1934. Miscellaneous manufactures were not affected by the depression in the same way as either textiles or metals, and the increasing extent of the restriction of imports from foreign countries according to the height of the tariff is, therefore, of particular interest.

IMPORTS, PRODUCTION AND THE HOME MARKET

The next three tables contain particulars showing the relation of production to imports and the changes in the size of the home market for different classes of goods. The examination of the additional value added between the factory and the port made by Mr. G. W. Daniels and Mr. H. Campion in the London and Cambridge Economic Service Special Memorandum No. 41 (August 1935) showed that in 1930 this represented 5–7 per cent. of the f.o.b. value. No detailed examination has been made for any later year, but it will probably not be far out to deduct 6 per cent. from the recorded exports in 1930, 1933 and 1934 to make the values roughly comparable with the factory value recorded for goods produced. The value given for goods available for the home market represents the value at place of production or importation. The effect of price changes has, as previously, been eliminated by revaluing the quantities produced or exported in 1933 and 1934 at the average values of the year 1930.

There was a considerable increase between 1930 and 1933 in the production of textiles and apparel and a very slight further expansion in 1934. The expansion in goods available for the home market was also less than 1 per cent. between 1933 and 1934; between 1930 and 1933 it amounted to 19 per cent. The increase in the home market was much less between 1930 and 1933 for goods

TABLE VII

Textiles *

(at 1930 average values)

Rate of duty		Imports	Production	Exports (estimated factory value)	Available for home market
		£ mill	£ mill.	£ mill.	£ mill.
10 per cent.	1930	6·2	135·3	23·9	117·6
	1933	1·0	163·7	25·7	139·0
	1934	1·0	160·2	24·4	136·8
20 per cent.	1930	23·9	167·4	101·5	89·8
	1933	8·4	194·0	92·2	110·2
	1934	8·2	196·2	94·3	110·1
25 per cent.	1930	4·7	13·3	2·7	15·3
	1933	2·7	16·2	2·3	16·6
	1934	3·5	18·1	2·8	18·8
30 per cent.	1930	2·1	6·7	1·2	7·6
	1933	1·2	8·3	0·9	8·6
	1934	1·4	9·1	1·0	9·5
Total	1930	36·9	322·7	129·3	230·3
	1933	13·3	382·2	121·1	274·4
	1934	14·1	383·6	122·5	275·2

* Including apparel of textile materials.

dutiable at 25 and 30 per cent. than for goods at lower rates of duty, but these goods, consisting mainly of hats and carpets, were responsible for the whole of the increase between 1933 and 1934, there being a slight reduction in the goods dutiable at 10 per cent. (yarns and wool tops), while goods dutiable at 20 per cent. showed hardly any change. Exports in the aggregate showed remarkably little change over the three years. Exports of all classes, except those dutiable at 10 per cent., increased between 1933 and 1934, and the slightly larger exports in 1934 were the sole cause of the increase in production of the goods at 20 per cent., and in the aggregate for the whole group. The decline in exports between 1930 and 1933 was essentially due to smaller exports of general textile manufactures, there being an increase in exports of the goods dutiable at 10 per cent. The picture presented is thus a substantial increase in production between 1930 and 1933, due in part to a reduction in imports, but mainly to an increase in the home market, there being a small decline in exports; between 1933 and 1934 the very small increase in production was not due to any further expansion in the home market, but to a slight increase in exports.

Table VIII

Metals

(at 1930 average values)

Rate of duty		Imports	Production	Exports (estimated factory value)	Available for home market
		£ mill.	£ mill.	£ mill.	£ mill.
Exempt from duty	1930	9·8	12·6	4·5	17·9
	1933	9·4	7·0	5·5	10·9
	1934	16·7	9·2	4·4	21·5
10 per cent.	1930	15·0	30·4	4·8	40·6
	1933	10·7	32·0	5·0	37·7
	1934	13·4	38·5	6·5	45·4
15 per cent.	1930	1·2	6·7	1·9	6·0
	1933	0·7	7·2	0·9	7·0
	1934	0·8	7·9	1·2	7·5
20 per cent.	1930	20·1	152·1	56·2	116·0
	1933	8·2	126·4	32·7	101·9
	1934	11·4	152·9	41·5	122·8
30 per cent.	1930	0·8	0·3	*	1·1
	1933	0·2	0·9	*	1·1
	1934	0·3	1·0	*	1·3
33⅓ per cent.	1930	17·0	118·8	26·9	103·9
	1933	6·1	109·0	19·5	95·6
	1934	9·0	131·3	20·3	120·0
Over 33⅓ per cent.	1930	0·1	0·5	0·1	0·5
	1933	*	0·7	0·1	0·6
	1934	0·1	0·9	0·1	0·9
Total	1930	64·0	321·4	94·4	291·0
	1933	35·3	283·2	63·7	254·8
	1934	51·7	341·7	74·0	319·4

* About £50,000.

For metals the picture is entirely different. There was in the first place a decline instead of an increase in production between 1930 and 1933; nearly the whole of this was due to a decline of one-third in exports, and the contraction of the home market by 12½ per cent. was mainly at the expense of imports. Between 1933 and 1934 there was a considerable all-round expansion, but the increase in the home market (25 per cent.) was much larger than that in exports (16 per cent.). One quarter of the increase in the home market was due to larger imports, nearly one half of the latter being in respect of the non-dutiable non-ferrous metals. Production of the metal goods dutiable at 10, 15 and 30 per cent. showed an increase in both 1933 and 1934, due partly in the first case to increased exports, the goods being in the main non-ferrous metal manufactures. In all these cases there was a considerable contraction in imports. The reduced production in 1933 of goods at 20 per cent. was due to smaller exports; for the iron and steel at 33⅓ per cent. three-quarters of the reduction resulted from smaller exports. The subsequent expansion in each case was primarily in goods for the home market.

TABLE IX

Miscellaneous Manufactures

(at 1930 average values)

Rate of duty		Imports	Production	Exports (estimated factory value)	Available for home market
		£ mill.	£ mill.	£ mill.	£ mill.
Exempt from duty	1930	7·7	11·8	1·3	18·2
	1933	7·6	14·2	1·3	20·5
	1934	8·4	15·6	1·0	23·0
10 per cent.	1930	17·7	48·7	10·9	55·5
	1933	14·7	54·9	9·1	60·5
	1934	15·5	70·1	9·7	75·9
15 per cent.	1930	10·9	30·2	5·0	36·1
	1933	9·0	30·3	4·3	35·0
	1934	10·2	34·2	4·5	39·9
20 per cent.	1930	13·9	108·2	13·5	108·6
	1933	7·3	121·3	11·6	117·0
	1934	8·4	130·5	12·5	126·4
25 per cent.	1930	1·9	15·0	3·9	13·0
	1933	1·2	14·4	2·7	12·9
	1934	0·9	16·4	3·2	14·1
30 per cent.	1930	1·4	6·2	1·4	6·2
	1933	0·4	11·0	1·2	10·2
	1934	0·5	12·2	1·2	11·5
Over 33 per cent.	1930	1·7	1·2	0·4	2·5
	1933	1·6	2·3	0·2	3·7
	1934	0·8	2·5	0·1	3·2
Total	1930	55·2	221·3	36·4	240·1
	1933	41·8	248·4	30·4	259·8
	1934	44·7	281·5	32·2	294·0

For the remaining goods for which quantitative particulars are available the picture again differs. The home market increased between 1930 and 1933, though not to the same extent as it did for textiles, and there was a marked expansion between 1933 and 1934 —not so great, however, as for metals. Miscellaneous goods, in fact, pursued a middle course between textiles and metals. Exports were relatively smaller than in the other two groups, and showed no very substantial changes. The increase in production in 1933 was due considerably more to the increase in the home market than to the decline in imports, and the 13 per cent. rise in 1934 was due to the same cause. For practically all rates of duty there was a movement in production, exports and the home market practically identical with that recorded for the total. There was, however, some decline in the home market, though not in production, for the miscellaneous goods dutiable at 15 per cent. The relative increases in production were least in the middle ranges—15, 20 and 25 per cent. —and these ranges also showed the smallest expansion in the home market.

PRICE CHANGES

The effect of price changes has been eliminated in the earlier part of this paper with a view to investigating the quantitative effect of the imposition of the tariff, in so far as that can be determined from the material available. The price changes that took place between 1930, 1933 and 1934 were very considerable, and cannot be estimated with ease from the same material as has been used hitherto. So far as goods produced in this country are concerned, the correct price change would not be arrived at by relating the aggregate of all goods revalued at the prices of the base year to the aggregate value of the goods as recorded. Duplication is too important. For imports the method adopted by the Board of Trade gives one measure of the change in average values, the quantities of the current year being revalued at the prices of the base year. The change in average values of imports between 1933 and 1934, as estimated by the Board of Trade, is accordingly dependent upon the make up of the imports in those years. I have, therefore, thought it best not to attempt to deal with the grand aggregate of goods covered by the Import Duties Act Inquiries, but have selected two samples differing in character, thinking that perchance they might show significant differences in price movement.

The first sample (A) which I have analysed relates to classes of commodities the production of which exceeded £1 million in value in 1934. I have had to omit from consideration certain of these important commodities owing to comparable particulars for 1930, 1933 and 1934 not being available. Changes in classification, resulting partly from the tariff, were numerous between 1930 and 1934. I have not included goods, such as sweetened condensed milk, or piece-goods of artificial silk mixed with other materials, which are dutiable partly under the Import Duties Act and partly under other enactments. Some items I have had to leave out owing to the absence of quantitative particulars and a few owing to their heterogeneous character—the price movement of "other sodium compounds," for example, is hardly significant. I have been able, on the other hand, to make use of information, such as that relating to plate glass, which cannot be published without the risk of disclosing the business of individual firms. For a second analysis of this sample, relating to the changes in average values between 1933 and 1934, a larger number of commodities has been used than was practicable for the first relating to production and oversea trade.

If imports are valued at the average values recorded for goods produced in the same year, it is possible, by comparing these values with the values as declared, to determine the general relationship of average values of imports to average values of goods of the same description produced in this country, and to indicate very roughly what changes have taken place in this relationship over the three years without having the comparison upset to any appreciable extent by changes in the general level of prices. In Table X the results are shown for the principal groups of trades in respect of the first sample examined. Timber has been shown as a separate group in the table in view of the heavy imports, the price movement of which would tend to obscure those of any group with which it was associated. For a similar reason it has been excluded from the total.

It appears at first sight from the figures in Table X that we have a selection of all possible relations between the prices of imports and goods of similar descriptions produced in this country. Seven of the ten groups, however, show a relative fall in average values of imports between 1930 and 1933, and there were six increases between 1933 and 1934. On the average there was a fall between 1930 and 1933 of about 16 per cent. in the average values of imports in relation to production, and for all goods included in the sample (excluding timber) a rise between 1933 and 1934, so that in the latter year relative average values of imports were about 15 per cent. less than in 1930. These changes result to some extent from changes in the make-up of imports arising from the tariff, but are not primarily attributable to that cause.

Textiles is the only group in Sample A in which imports were on the average dearer in 1930 than corresponding goods produced in this country. This was due largely to the average values of the woollen yarns imported being more than twice those of the woollen yarns produced in this country. Imports of such yarns formed over one quarter of the total sold in this country in 1930, but they were reduced by the tariff to a negligible proportion of the total. There was a very small fall in the average value of imports between

1930 and 1933, and it is clear that imports of all but the highest quality of woollen yarns were stopped by a 10 per cent. tariff.

TABLE X

Retained Imports (Sample A)

Trade group		As declared (a)	At average values of goods produced (b)	(a) as a percentage of (b)
		£ mill.	£ mill.	Per cent.
Textiles	1930	22·7	19·3	118
	1933	3·5	4·0	88
	1934	3·6	4·0	90
Iron and Steel	1930	13·2	15·7	84
	1933	3·1	4·3	73
	1934	4·8	6·4	75
Engineering and Vehicles	1930	2·9	3·5	81
	1933	0·8	0·6	119
	1934	1·2	0·8	166
Non-Ferrous Metals	1930	4·1	4·1	99
	1933	2·5	2·6	103
	1934	4·4	4·4	101
Leather and Clothing	1930	14·9	15·8	94
	1933	6·5	8·3	79
	1934	6·4	8·3	77
Food	1930	18·5	10·6	80
	1933	4·7	9·4	50
	1934	4·4	9·1	48
Chemicals	1930	13·2	13·2	100
	1933	7·7	8·0	96
	1934	8·1	8·3	98
Timber	1930	23·8	32·5	73
	1933	20·5	34·2	60
	1934	26·1	40·6	65
Clay and Building Materials	1930	5·5	6·5	84
	1933	2·8	3·0	93
	1934	3·2	3·6	87
Other Trades	1930	11·0	11·7	94
	1933	6·7	7·3	92
	1934	7·0	7·4	95
Total (excluding Timber)	1930	96·1	100·4	96
	1933	38·3	47·5	81
	1934	43·0	52·2	82

Imports of goods in the Engineering and Vehicles group are practically always small in relation to production in this country. The effect of the 20 per cent. tariff was to reduce imports by 1933 to certain descriptions of high average value. The absolute increase in average value in both 1933 and 1934 is indicated by the somewhat abnormal figures shown in the table for the relationship between average values of imports and production of certain goods in this group. It was only found possible to obtain 17 descriptions of goods in this group satisfying the conditions of the sample.

In the Clay and Building Materials group, also, there was an appreciable rise in relative average values of imports in 1933, though in this group a fall occurred in 1934. The rise between 1930 and 1933 resulted very largely from a relatively small fall in price of imported domestic and fancy glassware, imports being reduced nearly 50 per cent. by the 20 per cent. tariff, and a very striking fall in the average value of the similar goods produced in this country arising from production being more than twice as great in 1933 as in 1930.

In the Food group average values of imports were in each year much lower than those of home-produced goods of similar descriptions. This is due very largely to imported meat extracts and essences being in 1930 about one half and in 1933 one quarter the value per cwt. of extracts and essences produced in this country, though for none of the limited number of foodstuffs included in this sample was home production less in average value than imports in any year. The fourfold increase in imports of wheat offals between 1930 and 1933, as a result of the expansion in production of livestock in this country, may be noted, with a relative fall in price greater than the 10 per cent. duty.

Sample A was selected irrespective of the extent of the competition of imports with home production. In most instances the share of the home market held by British goods was very high, though in 1930 it was as little as 20 per cent. for vacuum cleaners and 23 per cent. for whale oil. In cases where imports form only a small proportion of the total goods available for consumption the price changes and other changes consequent upon the imposition of a tariff may be different from those occurring in cases where imports are more competitive. Sample B has therefore been selected from those commodities for which imports formed in 1930 at least one-third of the total in the home market. Only those commodities have been selected which are reasonably homogeneous, though even in these cases it is known that many different grades or qualities may be recorded together. To eliminate cases of relatively little importance the sample does not include any commodity where the production was valued at less than £25,000 in 1930, while in a few instances, such as unrefined linseed oil, wire rods and safety-razor blades, it overlaps the first sample. It was only found possible to identify

67 commodities satisfying these conditions. Of these 21 were in the Chemicals group and a similar number in the metal trades.

As has already been seen, Sample A showed a fall of about 16 per cent. between 1930 and 1933 in average values of imports relative to production, this fall being little short of the average duty imposed. So that for the important commodities included in this sample, internal prices of imports on the average showed in each year about the same relationship to prices of goods produced in this country. Accordingly, it could be assumed, among possible explanations, that manufacturers took full advantage of the tariff to increase prices, or that importers decreased their prices by nearly the amount of the duty. In view of the nature of the sample the latter explanation seems the more probable.

For the competitive sample (B) the position is different. Table XI shows that the relationship of average values of imports to average values of similar descriptions of goods produced in this country was very similar in each of the three years 1930, 1933 and 1934, the relative figures varying only from 81 to 85 per cent. Even if the goods not liable to duty are excluded, the relative price changes are under one half of those for Sample A. In 1930 the relation of average values of imports to production was considerably lower for the dutiable goods in this sample (81 per cent.) than for those in Sample A (95 per cent.), and it may be that these competitive goods needed that price difference to enable them to enter the United Kingdom market to the extent they did. For the dutiable goods the actual proportion of imports in the home market was 58 per cent. in 1930, and this was reduced to 40 per cent. in 1933 and 1934. The effect of the tariff was substantially to make the internal price of imported competitive goods some 10 per cent. below the price of similar home-produced goods instead of 20 per cent. below as in 1930. To enable imports to compete in the new conditions it is likely that there was some price reduction, and there may have been some cutting off of imports of the more highly priced goods formerly able to be imported, which would also lead to a lower average value of competitive imports as a whole. Since there was no substantial change in the price relationship between imported and home-produced goods, it is possible that the home manufacturer, as a result of his expanding production, may have been able to reduce his costs. It would not seem likely, at any rate, that the result of the tariff was to raise the price of the home-produced article. Some evidence bearing on this point is considered later on.

Table XI shows retained imports in Samples A and B distributed according to the rates of duty.

As might be expected, there are considerable variations for the

TABLE XI

Retained Imports

Rate of duty		Sample A *			Sample B		
		As declared (*a*)	At average values of goods produced (*b*)	(*a*) as a percentage of (*b*)	As declared (*a*)	At average values of goods produced (*b*)	(*a*) as a percentage of (*b*)
		£ mill.	£ mill.	Per cent.	£ mill.	£ mill.	Per cent.
Exempt from duty	1930	8·9	8·6	104	15·7	16·3	97
	1933	6·9	6·5	106	9·9	10·2	97
	1934	8·65	8·0	108	12·6	13·3	95
10 per cent.	1930	35·2	34·0	104	18·4	18·7	98
	1933	15·8	1·4	74	11·1	11·7	95
	1934	5·4	0·7	74	12·3	13·7	90
15 per cent.	1930	5·4	5·5	99	4·0	6·2	65
	1933	3·8	4·6	83	2·4	4·5	54
	1934	4·3	5·2	83	2·6	5·0	51
20 per cent.	1930	29·2	28·9	101	8·3	13·5	62
	1933	7·0	7·0	100	3·1	5·7	55
	1934	8·3	8·2	102	3·3	5·6	60
25 per cent.	1930	1·5	3·1	50	2·4	3·1	77
	1933	0·1	0·5	30	0·5	0·8	64
	1934	0·2	0·7	35	1·0	1·5	67
30 per cent.	1930	4·1	6·5	63	1·2	1·5	77
	1933	1·9	3·6	53	0·3	0·4	82
	1934	2·05	3·9	52	0·4	0·5	82
33⅓ per cent.	1930	10·6	12·2	87	3·1	3·4	89
	1933	2·3	3·4	68	0·6	0·8	71
	1934	3·6	5·1	72	1·0	1·5	72
Over 33⅓ per cent.	1930	1·1	1·7	68	2·2	2·6	85
	1933	0·4	0·5	73	1·0	1·3	78
	1934	0·4	0·4	95	0·8	0·8	97
Total	1930	96·1	100·4	96	55·3	65·3	85
	1933	38·3	47·5	81	28·9	35·4	82
	1934	3·0	52·2	82	34·0	41·9	81

* Excluding timber.

different groups, but for sample B only in respect of goods dutiable at 15 per cent. was the price fall for imports in relation to production as great as the duty imposed. In Sample A there was an outstanding price fall for goods at 10 per cent., due mainly to the inclusion of the whole of the food items in this category. Deducting foods, the percentage figures become 114, 92 and 95 in 1930, 1933 and 1934, respectively. The relative price fall of imports in this group other than food was accordingly somewhat larger than the average, leather being partly responsible for this result. The comparatively small change between 1930 and 1933 in the relative prices of imports of goods dutiable at 20 per cent. may be noted. The number of items dutiable at 25 and at $33\frac{1}{3}$ per cent. in either sample is too small for the figures to have any significance. For the total of goods dutiable at over 20 per cent. the percentages in the final column of Table XI are :—

	1930	1933	1934
Sample A	74	59	63
Sample B	84	74	74

The changes in average values between 1933 and 1934 of the dutiable goods produced in this country are shown in Table XII for Samples A and B. The changes range from — 25 per cent. to + 30 per cent. for Sample A and a slightly wider range for Sample B. The regression equation for Sample A is

$$y = \cdot 087x - 0{\cdot}43$$

where y represents the change in average value between 1933 and 1934 and x the rate of duty.

For Sample B the regression equation is

$$y = \cdot 180x - 5{\cdot}26$$

TABLE XII

Distribution of Percentage Changes in Average Values of Goods Produced in 1934 *Relative to* 1933

Rate of duty	−30	−25	−20	−15	−10	−5	0	+5	+10	+15	+20	+25	+30	+35	Total
Per cent.															
							Sample A								
0					3		2		1	1					7
10		1		2	11	18	21	10	6	1	1	1	1		73
15					1	1	4	3	1			1			11
20				3	7	12	32	16	20	1	3	2			96
25 and over					3	5	13	15	2						38
Total ...		1		5	25	36	72	44	30	3	4	4	1		225
							Sample B								
0					2	1									3
10			1	2	5	3	5	2	1						19
15	1	1	1			2	1	1	1			1			9
20				3	2	5	2	3	3		1	1		1	21
25 and over					1	3	5	5	1						15
Total ...	1	1	2	5	10	14	13	11	6		1	2		1	67

The correlation coefficients, 0·09 and 0·20, indicate that there is no close relationship between price changes between 1933 and 1934 and the height of the tariff.

The averages of the price changes recorded in Table XII are as follows :—

	Rate of duty			
	10 per cent.	15 per cent.	20 per cent.	Over 20 per cent.
Sample A	−0·8	+3·2	+2·4	+1·1
Sample B	−5·0	−5·0	+1·7	+0·7

For competitive goods there was a definite fall between 1933 and 1934 in average values of those at 10 and 15 per cent., whereas for the goods of which the value produced in this country is very large, changes were smaller. For each sample goods dutiable at higher rates showed a tendency to rise in price between 1933 and 1934.

The volume of production of the competitive goods shows increases of 32 and 47 per cent. for 1933 and 1934 compared with 1930. These are much higher than those recorded in Table II for any group of trades. The combination of this fact with those relating to price changes mentioned above would seem to indicate the probability that expanding home production led to increased efficiency and to a progressive reduction in the cost of production of these competitive goods, which was suggested as a possible reason for the price relationship of imports and production showing no very marked change after the imposition of the tariff.

The totals, at average values of goods produced in this country in the three years, of home production, exports, imports and goods available for the home market, are given in Table XIII for Samples A

TABLE XIII

Production, Exports and Imports

Year	At average values of goods produced					As declared
	Production	Exports	British goods in home market	Total goods in home market	Retained imports	Retained imports
	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.
			Sample A			
1930	816·0	191·4	624·6	725·0	100·4	96·1
1933	703·0	134·4	568·6	616·1	47·5	38·3
1934	765·2	142·1	623·1	675·3	52·2	43·0
			Sample B			
1930	53·3	8·8	44·5	109·8	65·3	55·3
1933	53·1	7·5	45·6	81·0	35·4	28·9
1934	57·3	7·1	50·2	92·1	41·9	34·0

and B. The proportionate results for the various years are not comparable with those which can be calculated from Tables VII to IX, owing to the differing methods of valuation. The production and import figures for 1930 show the relative importance of the samples.

THE PRESENT TARIFF

The tariff as it existed at the end of 1933 has been the basis of the previous analysis of some results of the Import Duties Act. There have been changes since then in a number of respects, most of which are of relatively minor importance as affecting the general incidence of the tariff and the relation of the goods affected by the Import Duties Act to goods dutiable under other enactments. Appendix III shows the general tariff structure of the country as it existed at the end of last year. The appendix contains particulars for the years 1930–36, those for 1936 being provisional, and distinguishes, so far as imports of food, drink and tobacco and raw materials are concerned, between imports from British and from foreign countries. The imports from British countries include all such imports, and not only those receiving preference; in particular, imports from the Irish Free State are included, though these are not entitled to preferential treatment under the Import Duties Act. The figures for the earlier years, particularly those for manufactured goods, should be regarded as approximate only, since information as to imports is not available for a number of items. The proportion of British to total imports in the various tariff groups is shown so as to indicate in what directions imports from British countries have advanced most. Appendix IV shows the proportion which each tariff group bore in each year to the total for food, drink and tobacco, raw materials or manufactured articles, respectively. Detailed figures for imports in each tariff group in 1936 are not available, and though the distribution of imports at the various rates of duty in 1936 probably differed in some respects from that in 1935, a general idea of the incidence of the Import Duties Act duties on manufactured articles can be gained from the imports in 1935 of goods dutiable under that Act according to the tariff in force at the end of last year. These figures are given in Appendix V, with comparative data relating to the distribution according to the tariff in force on 31st December, 1935.

In respect of food, drink and tobacco and raw materials imported under practically every description of duty—exempt, Import Duties Act, 10 per cent. and other, Ottawa, Beef and Veal, and other—the British proportion of the total increased to a considerable extent over the period 1930–36, the only exceptions of any importance being the raw materials exempt from duty, for which the British proportion was about 40 per cent. in each year, and food, drink and tobacco liable to the old revenue duties. The most striking increase was in the goods dutiable under the Ottawa Agreements Act, the British proportion for food so dutiable rising from 44 to 65 per cent. of the total and for the proportionately small raw materials from 28 to 85 per cent. For manufactures exempt from duty, mainly copper and newsprint, the British proportion rose from 29 to 46 per cent., and for those dutiable under the Import Duties Act from about 11 to 24 per cent. The British proportion of food dutiable under the Import Duties Act and Ottawa Agreements Act showed in each case the most marked rise between 1931 and 1932, mainly as a result of reduced imports from foreign countries; but there was some rise in each case in the value of imports from British countries.

Expressed in terms of values, the concession of free entry for imports from British countries, if grown, produced or manufactured in the British Empire, was most valuable in respect of food dutiable under the Ottawa Agreements Act, the next most substantial increases being for manufactured articles dutiable under the Import Duties Act and raw materials dutiable at 10 per cent. under that Act. There were also large increases in the value of imports from British countries of manufactures exempt from duty and of food exempt from duty. The increase for food resulted wholly from the quantitative restriction of imports from foreign countries of bacon, hams and frozen pork, and mutton, the last being provided for in the Ottawa Agreements Act. Deducting these descriptions of meat, the value of food exempt from duty imported from foreign countries rose from about £10 million in 1930 to £18 million in 1936. The Beef and Veal duties came into force on 16th December last, the importation of chilled and frozen beef having been restricted previously, as provided for in the Ottawa Agreements Act.

Food liable to the general ad valorem rate has formed a remarkably steady proportion by value of the total food imported (about one-eighth), while apart from higher proportions in 1931 and 1932 this is true also of food liable to other rates of duty under the Import Duties Act, including in such rates commodities subject to specific rates during part of the year only. The restriction of imports has been most marked in respect of commodities on the free list subject to the Irish Free State Special Duties, though in this case the proportion of the total rose in 1935 and 1936 as a result of the operation of the coal–cattle agreement. Adding other goods on the free list, the proportion of the total has varied only from 20 to 21½ per cent., and 21 per cent. was only exceeded in 1934, when there was a marked reduction in the proportion of goods liable to Ottawa duties. Since the Import Duties Act came into force in March 1932, food, drink and tobacco liable to the old revenue duties have tended to form a rather larger proportion of the total—about one quarter—than they did before. The value of goods coming within the scope of the Ottawa Agreements Act forms some 30 per cent. of the total.

The immediate effect of the Import Duties Act on raw materials was a reduction in the proportion of the total liable to duty, and the Ottawa Agreements Act had a similar effect when it came into operation late in 1932. The proportion on the free list rose in consequence from about 68½ to over 70 per cent. Raw materials dutiable at the general ad valorem rate now represent about one quarter of the total, and those dutiable at any higher rate than 10 per cent. have represented under 5 per cent. of the total in each year subsequent to 1932.

As regards manufactures, the proportion represented by goods exempt from duty has risen steadily from 7 per cent. to double that figure, and the machinery licensed for importation duty free and goods consigned direct to registered shipbuilding yards, which are exempt from duty, have also increased in importance since 1933, the value last year representing about 3½ per cent. of the total dutiable under the Act. The abnormal importation at the end of 1931 of goods which it was expected might be subject to a tariff is shown clearly by the value of goods now dutiable under the Import Duties Act rising from 65 to 69 per cent. of the total. Subsequent to 1931 the proportion has been reduced to rather less than three-fifths. Dutiable hydrocarbon oils in the last three years have represented about one-sixth of the total imports, a proportion higher than in years prior to 1932. Imports of silk and artificial silk goods have declined steadily from about 9 per cent. of the total to half that figure, these goods including some dutiable also under the Import Duties Act.

Of the manufactures dutiable under the Import Duties Act, about one-third are at present dutiable at 20 per cent., and rather more than this proportion at lower rates of duty, the proportion represented by goods on which no additional duty has been imposed being rather less than one-quarter of the total. Some 15 per cent. of the total consists of goods on which mixed ad valorem and specific rates of duty have been imposed, the minimum ad valorem rate being mainly 10 per cent. and 20 per cent. Goods subject only to specific rates are only about a quarter as important as the last-mentioned class.

The actual incidence of the tariff on foreign imports has been calculated by relating the duty charged to the value of the imports charged with duty; goods exempt from duty, including goods consigned to shipbuilding yards and machinery licensed for free importation are not included in the calculation. A more accurate measure of changes in the height of the tariff could be obtained by applying the rates of duty to the normal importation of the various descriptions of goods; but in a very great number of instances duties have been imposed upon classes of goods for which the statistical classification did not previously provide. Accordingly, no calculation of the kind suggested can be made with any degree of precision.

The calculation of the incidence of the tariff tends to become less precise as the ad valorem rates are replaced by specific rates or mixed rates, as has happened very frequently in the course of the past two years. For 1933 the average rate of duty charged was 18·5 per cent. This rose to 19·4 in 1934, and has since declined to 19·3 and 19·1 per cent. in the past two years, the reduction in the average rate since 1934 being due in main part to changes in the iron and steel duties and to the varying make up of imports, while reductions in some duties as a result of trade agreements with foreign countries have been offset by increased duties on a number of other products.

From the distribution of imports in 1935 according to the tariffs in force at the end of 1935 and 1936, it appears that last year there were reductions in respect of goods dutiable at 15 and 20 per cent., a substantial increase in those at specific rates and smaller increases in goods dutiable at 30 per cent. and at mixed ad valorem and specific rates. Since the increase in the latter was primarily in goods dutiable at a minimum ad valorem rate of 33⅓ per cent., and specific rates tend to be higher than the ad valorem rates which they replace, there was apparently some increase last year in the height of the tariff.

APPENDIX I

VOLUME OF PRODUCTION IN CERTAIN TRADES

Trade	1924	1930	1933	1934
Textiles :—				
Cotton Spinning	148	100	112	114
Cotton Weaving	166	100	114	116
Woollen and Worsted	134	100	129	128
Hosiery	94	100	133	138
Textile Finishing	128	100	115	118
Silk and Artificial Silk	59	100	167	190
Linen and Hemp	123	100	110	123
Jute	122	100	101	111
Rope, Twine and Net	94	100	97	103
Metals :—				
Mechanical Engineering	96	100	76	95
Electrical Engineering	74	100	102	127
Motor and Cycle	66	100	—	135
Iron and Steel Smelting and Rolling ...	115	100	94	115
Iron and Steel Foundries	100	100	99	117
Hardware, Hollow-ware, Metallic Furniture and Sheet Metal	69	100	107	124
Chain, Nail, Screw and Miscellaneous Forgings	75	100	93	120
Finished Brass	96	100	91	102
Copper and Brass Smelting, Rolling, etc.)	107	100	98	126
Wrought Iron and Steel Tube	86	100	111	132
Aluminium, Lead, Tin, etc. Smelting, Rolling, etc.)	89	100	92	110
Aircraft	33	100	88	99
Plate and Jewellery	111	100	95	102
Tool and Implement	123	100	114	121
Tinplate	113	100	94	92
Wire	97	100	101	120
Blast Furnaces	115	100	65	92
Railway Carriage and Wagon Building ...	137	100	51	69
Needle, Pin and Metal Smallwares ...	94	100	114	128
Cutlery	85	100	152	182
Miscellaneous :—				
Boot and Shoe	94	100	108	106
Brick and Fireclay	90	100	111	135
Chemicals, Dyestuffs and Drugs	90	100	124	136
China and Earthenware	109	100	99	107
Paper	86	100	113	131
Rubber	70	100	112	122
Preserved Foods	76	100	123	126
Glass	80	100	110	133
Biscuit	78	100	120	136
Timber Sawmilling	79	100	102	108
Hat and Cap	87	100	109	117
Leather Tanning and Dressing	108	100	102	102
Grain Milling	105	100	107	112
Soap, Candle and Perfumery	100	100	110	120
Scientific Instruments	86	100	—	112
Building Materials	62	100	90	103
Paint, Colour and Varnish...	79	100	99	108
Fancy Articles	117	100	149	181
Leather Goods	108	100	104	112
Coke	102	100	90	108
Butter, Cheese, etc.	77	100	101	120
Linoleum	103	100	123	138
Seed Crushing	128	100	108	116
Musical Instruments	70	100	—	45
Brush	92	100	119	128
Cement	70	100	97	116

APPENDIX II

VOLUME OF OUTPUT PER PERSON EMPLOYED IN CERTAIN TRADES

Trade	No. of persons employed in 1934	1924	1930	1933	1934
Textiles —					
Cotton Spinning	183,750	112	100	117	118
Cotton Weaving	171,352	120	100	122	127
Woollen and Worsted	236,889	113	100	126	123
Hosiery	114,294	103	100	126	128
Textile Finishing	98,905	117	100	124	135
Silk and Artificial Silk	72,946	88	100	173	182
Linen and Hemp	70,301	90	100	120	125
Jute	23,535	102	100	128	136
Rope, Twine and Net	14,564	102	100	112	117
Metals :—					
Mechanical Engineering ...	360,486	99	100	99	108
Motor and Cycle	200,638	66	100	—	132
Iron and Steel (Smelting and Rolling)	126,837	100	100	113	128
Iron and Steel Foundries ...	99,574	102	100	104	108
Hardware, Hollow-ware, Metallic Furniture and Sheet Metal	89,850	86	100	107	114
Chain, Nail, Screw and Miscellaneous Forgings	52,706	94	100	98	108
Copper and Brass (Smelting, Rolling, etc.)	25,683	99	100	108	123
Wrought Iron and Steel Tube...	24,811	89	100	134	138
Aluminium, Lead, Tin, etc. (Smelting, Rolling, etc.) ...	24,804	89	100	95	98
Aircraft	23,775	59	100	92	88
Plate and Jewellery	23,731	95	100	104	109
Tinplate	22,638	102	100	101	103
Wire	21,373	86	100	111	123
Blast Furnaces	14,873	82	100	109	120
Railway Carriage and Wagon Building	12,255	108	100	101	114
Needle, Pin and Metal Small Wares	11,812	86	100	99	103
Cutlery	10,181	88	100	160	184
Miscellaneous :—					
Boot and Shoe	112,637	88	100	111	109
Brick and Fireclay	84,466	96	100	111	121
Chemicals, Dyestuffs and Drugs	73,347	94	100	126	128
China and Earthenware ...	65,492	110	100	108	111
Paper	57,874	89	100	110	121
Rubber	54,998	76	100	113	116
Preserved Foods	48,903	88	100	109	110
Glass	43,525	93	100	101	110
Biscuit	39,897	102	100	115	123
Timber (Saw-milling)	34,317	91	100	111	111
Hat and Cap	30,016	89	100	111	119
Leather (Tanning and Dressing)	29,432	102	100	101	100
Grain Milling	28,379	92	100	101	104
Soap, Candle and Perfumery ...	28,139	92	100	115	116
Building Materials	26,588	91	100	100	108
Paint, Colour and Varnish ...	23,289	91	100	96	99
Coke	13,151	84	100	120	125
Butter, Cheese, etc.	12,986	80	100	107	113
Linoleum	12,141	107	100	131	146
Seed Crushing	10,754	100	100	111	118
Brush	10,481	92	100	117	124
Cement	10,136	60	100	111	126

APPENDIX III

ANALYSIS OF TOTAL IMPORTS ACCORDING TO THE TARIFF ON 31ST DECEMBER, 1936

Description of duty	1930	1931	1932	1933	1934	1935	1936
	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.
Class I—Food, drink and tobacco:—							
Exempt from duty—							
British	17·7	16·3	15·1	17·2	21·9	21·6	23·2
Foreign	60·4	50·6	47·3	44·8	46·7	41·6	45·4
British proportion, %	*23*	*24*	*24*	*28*	*32*	*34*	*34*
Import Duties Act—							
10 per cent.:							
British	12·3	10·7	12·0	11·0	11·9	13·3	14·2
Foreign	47·9	40·0	32·3	30·8	32·7	33·1	34·8
British proportion, %	*20*	*21*	*27*	*26*	*27*	*29*	*29*
At other rates:							
British	4·4	5·1	6·1	5·4	6·7	6·5	6·0
Foreign	23·0	24·4	18·4	13·2	12·6	13·3	14·4
British proportion, %	*16*	*17*	*25*	*29*	*35*	*33*	*29*
Ottawa—							
British	61·8	53·8	63·2	58·5	53·2	60·1	75·5
Foreign	77·1	66·3	46·9	38·5	37·2	41·7	39·8
British proportion, %	*44*	*45*	*57*	*60*	*59*	*59*	*65*
Fruit which cannot be allocated to above headings *—							
British	3·7	3·1	3·6	3·4	3·6	4·1	4·2
Foreign	8·2	9·1	6·0	6·4	5·7	6·1	4·8
British proportion, %	*31*	*25*	*38*	*35*	*39*	*40*	*47*
Irish Free State Special Duties †	21·6	18·2	11·9	7·6	6·1	7·4	8·6
Beef and Veal Duties—							
British	2·7	2·7	2·4	3·0	3·9	4·1	3·9
Foreign	27·4	22·8	20·4	16·5	15·0	14·7	15·4
British proportion, %	*9*	*11*	*11*	*15*	*21*	*22*	*20*
Other duties—							
British	53·9	47·3	45·9	46·8	48·1	45·9	49·2
Foreign	52·9	45·4	41·4	36·8	41·3	41·6	43·3
British proportion, %	*50*	*51*	*53*	*56*	*54*	*52*	*53*
Total—Class I—							
British	178·1	157·2	160·2	152·9	155·4	163·0	184·8
Foreign	296·9	259·5	212·7	187·0	191·2	192·1	197·9
Total	475·0	416·7	372·9	339·9	346·6	355·1	382·7
British proportion, %	*37*	*38*	*43*	*45*	*45*	*46*	*48*
Class II—Raw materials and articles mainly unmanufactured:—							
Exempt from duty—							
British	71·6	47·5	46·1	50·9	63·5	62·8	69·6
Foreign	100·7	71·1	69·1	78·3	84·9	87·2	104·6
British proportion, %	*42*	*40*	*40*	*39*	*43*	*42*	*40*
Import Duties Act—							
10 per cent.:							
British	15·4	10·7	11·7	13·3	14·9	17·5	22·3
Foreign	48·6	33·0	27·8	29·5	37·2	33·7	39·9
British proportion, %	*24*	*24*	*30*	*31*	*29*	*34*	*36*

APPENDIX III (*continued*)

Description of duty	1930	1931	1932	1933	1934	1935	1936
	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.	£ mill	£ mill.
At other rates:							
British	0·2	0·2	0·2	0·3	0·3	0·2	0·3
Foreign	3·1	2·3	1·6	1·1	1·4	2·2	1·5
British proportion, %	*6*	*8*	*12*	*23*	*19*	*9*	*18*
Ottawa—							
British	1·6	0·4	0·4	1·8	1·9	1·1	3·4
Foreign	4·1	4·2	3·4	1·1	0·6	2·0	0·6
British proportion, %	*28*	*9*	*11*	*62*	*76*	*35*	*85*
Other duties—							
British	0·3	0·1	0·0	0·1	0·2	0·1	0·1
Foreign	5·5	4·1	4·7	4·5	5·1	5·5	5·9
British proportion, %	*5*	*2*	*0*	*2*	*4*	*2*	*2*
Total—Class II—							
British	89·1	58·9	58·5	66·4	80·8	81·7	95·7
Foreign	162·0	114·7	106·5	114·5	129·2	130·6	152·5
Total ‡	251·1	173·6	165·0	180·9	210·0	212·3	248·2
British proportion, %	*35*	*34*	*35*	*37*	*38*	*38*	*39*
Class III—Articles wholly or mainly manufactured :—							
Exempt from duty ...	22·5	18·2	15·2	15·2	22·4	27·4	30·6
British proportion, %	*29*	*32*	*37*	*44*	*37*	*40*	*46*
Import Duties Act ‡	200·2	181·0	94·3	89·5	100·9	106·4	127·1
Ottawa					0·2	0·5	0·3
Silk and Artificial Silk ...	27·0	24·9	11·5	10·5	9·5	9·2	9·3
McKenna	10·1	6·8	5·1	4·8	6·2	7·5	8·2
Key Industry	2·3	2·3	1·8	2·0	2·4	2·4	2·8
Hydrocarbon Oil ...	43·3	26·8	28·6	27·6	28·5	30·3	33·9
Other duties	1·4	1·3	0·9	0·8	0·8	0·8	0·7
Total—Class III ...	306·8	261·3	157·4	150·4	170·9	184·5	212·9
British proportion, %	*10*	*10*	*16*	*18*	*19*	*20*	*23*

---

* Oranges, peaches and nectarines, plums and grapes (other than hothouse), which are dutiable at 10 per cent. under the Import Duties Act during periods of the year when they are not liable to Ottawa duties.

† Including only goods not liable to duty under the Ottawa Agreements Act or the Import Duties Act.

‡ The figures for 1932 to 1936 include the following imports from foreign countries on which no duty was charged :—

	1932	1933	1934	1935	1936
	£ mill.	£ mill.	£ mill.	£ mill.	£ mill.
Goods consigned to registered shipbuilding yards :—					
Class II	—	0·2	0·4	0·5	1·2
Class III	—	0·1	0·3	0·4	1·0
Machinery imported under licence	0·6	1·9	2·3	2·3	3·2

APPENDIX IV

DISTRIBUTION OF TOTAL IMPORTS ACCORDING TO THE TARIFF ON 31ST DECEMBER, 1936

Description of tariff	1930	1931	1932	1933	1934	1935	1936
	%	%	%	%	%	%	%
Class I—Food, drink and tobacco:—							
Exempt from duty ...	16·5	16·0	16·7	18·3	19·8	17·8	17·9
Import Duties Act—							
10 per cent.	12·7	12·4	11·9	12·3	12·8	13·1	12·8
At other rates ...	5·8	7·1	6·6	5·5	5·6	5·6	5·3
Ottawa	29·2	28·8	29·5	28·5	26·1	28·6	30·1
Fruit which cannot be allocated to above headings	2·5	2·9	2·6	2·9	2·7	2·9	2·4
Irish Free State Special Duties	4·5	4·4	3·2	2·2	1·8	2·1	2·3
Beef and Veal Duties ...	6·3	6·1	6·1	5·7	5·5	5·3	5·0
Other duties	22·5	22·3	23·4	24·6	25·7	24·6	24·2
Total—Class I ...	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Class II—Raw materials and articles mainly unmanufactured:—							
Exempt from duty ...	68·6	68·3	69·8	71·4	70·7	70·7	70·2
Import Duties Act—							
10 per cent.	25·5	25·2	23·9	23·7	24·8	24·1	25·1
At other rates ...	1·3	1·4	1·1	0·8	0·8	1·1	0·7
Ottawa	2·3	2·7	2·3	1·6	1·2	1·5	1·6
Other duties	2·3	2·4	2·9	2·5	2·5	2·6	2·4
Total—Class II ...	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Class III—Articles wholly or mainly manufactured:—							
Exempt from duty ...	7·3	7·0	9·7	10·1	13·1	14·8	14·4
Import Duties Act	65·3	69·3	59·9	59·5	59·0	57·7	59·7
Ottawa					0·1	0·3	0·1
Silk and Artificial Silk ...	8·8	9·5	7·3	7·0	5·6	5·0	4·4
McKenna	3·3	2·6	3·2	3·2	3·6	4·1	3·9
Key Industry	0·7	0·9	1·1	1·3	1·4	1·3	1·3
Hydrocarbon Oil ...	14·1	10·2	18·2	18·4	16·7	16·4	15·9
Other duties	0·5	0·5	0·6	0·5	0·5	0·4	0·3
Total—Class III ...	100·0	100·0	100·0	100·0	100·0	100·0	100·0

APPENDIX V

ANALYSIS OF TOTAL IMPORTS OF MANUFACTURED ARTICLES IN 1935 DUTIABLE UNDER THE IMPORT DUTIES ACT ACCORDING TO THE TARIFF ON 31ST DECEMBER, 1936

Rate of duty	Total	British countries	Foreign countries	Proportion from British countries	Proportion of total at each rate	
					1936	1935 *
	£ mill.	£ mill.	£ mill.	Per cent.	Per cent.	Per cent
10 per cent. ...	24·6	6·7	17·9	27	23·1	23·2
15 per cent. ...	9·9	1·0	8·9	10	9·3	9·9
16⅔ per cent. ...	3·9	0·0	3·9	0	3·7	3·7
20 per cent. ...	37·0	5·1	31·9	14	34·8	36·3
25 per cent. ...	3·7	0·4	3·3	11	3·5	3·5
30 per cent. ...	5·8	0·7	5·1	12	5·4	5·0
33⅓ per cent. ...	1·6	0·3	1·3	19	1·5	1·4
Specific rates ...	4·2	1·2	3·0	29	3·9	2·7
Mixed ad valorem and specific rates †	15·7	7·2	8·5	46	14·8	14·3
Total	106·4	22·6	83·8	21	100·0	100·0

* Tariff on 31st December, 1935.

† This total is distributed according to the minimum ad valorem rates as follows:—10 per cent. £6·7 million (British 92 per cent.); 15 per cent. £0·3 million (British nil); 20 per cent. £7·6 million (British 13 per cent.); 25 per cent. £0·7 million (British 6 per cent.); 33⅓ per cent. £0·4 million (British nil). The total at 10 per cent. includes goods which may be imported at a lower rate of duty.

DISCUSSION ON MR. LEAK'S PAPER.

SIR PERCY ASHLEY: It is my pleasant duty to move a Vote of Thanks to Mr. Leak for his very interesting and illuminating paper. At an early stage he expressed the hope that the result of his investigations would be of service to those who are concerned with the administration of the Import Duties Act. Speaking for myself and for those with whom I am associated in the administration of that Act, I can assure him that his paper will receive our immediate and most careful consideration—an ancient and honoured phrase, but one which in this instance really does mean what it says.

There is, I suppose, some difference of opinion in this assembly as to the policy of which the Import Duties Act is the statutory expression, but there will, I am sure, be unanimity that section 9 of that Act is a valuable piece of legislation, as it provides the basis and sanction for the annual returns of which the first two are the subject of Mr. Leak's survey. These returns are an indispensable extension of the data collected under the Census of Production Acts, indispensable because in the rapidly changing conditions of to-day the intervals between those main censuses are much too long.

Only those who have to deal from day to day with applications from industries for action in respect to tariffs—for increases of duty, for reductions of duty, for drawbacks—and with matters arising in the course of negotiations for commercial treaties, can realize fully how incomplete are the data possessed by even organized trades—with a few honourable exceptions, two of which are represented in this meeting—as to the trend of output, and how great are the difficulties encountered in the collection of data on a voluntary basis. But the most complete data possible are essential to any industry for its own wise conduct, and they are equally essential to those who have to sit in judgment on an industry's claims. The Censuses under this Act lighten the burden: they will do so increasingly as we have a larger number of years for comparison; and the task will be still more lightened if we can have from time to time, from the same authoritative source, periodical surveys of the kind which Mr. Leak has given to us this afternoon. In that connection there is one thing I specially want to say. The communications between my department and the Board of Trade, the requests for information which we make to that Office, are very numerous and, fortunately, information which under the Act may not be published at large can be furnished to my Committee for the purposes of the discharge of its functions. I am glad to have this opportunity of expressing the appreciation of myself and my office of the constant, ready and very helpful co-operation which we have had from Mr. Leak and his colleagues.

I shall not be expected to enter upon any discussion of the conclusions which Mr. Leak has presented. That discussion I leave to others present who are less trammelled than myself. I can only say that all the conclusions seem to me interesting, some of them extremely suggestive, and most of them very encouraging from my particular point of view. I should have felt a little more confidence in them if they had related to a somewhat longer series of years, but I gather from the opening passage in Mr. Leak's paper that he was particularly interested in the immediate effects of the introduction of the tariff. As to that I am not quite certain whether this particular case affords any very good guidance, in view of the very special conditions of the years 1931 and 1932 in which the policy was introduced: but nevertheless, as I have said, the results, however qualified, do seem to me very interesting and suggestive.

There are just one or two points of detail of which I should like some elucidation. In paragraph 2, on page 559, Mr. Leak says that for the purpose of the enquiry it was decided to cut out the clothing trades, but in the table on page 560, it appears that some part of the clothing trade was in fact included. It would be useful to have it made clear what precisely the heading does comprise.

On page 567 there is a statement that the leather (tanning and dressing) trade is the only one of a long list of trades where the output per person had shown no increase in the ten years from 1924.

On page 574 Mr. Leak indicates some surprise at the order in which the figures for textiles run, in contrast with those for metals and miscellaneous trades. He does offer some partial explanation, but that particular case seems to me to be an illustration of the danger of concentrating headings. "Textiles" in that case has a very wide connotation, and if there were an indication of the goods comprised within each tariff duty group, the column would, I think, become a good deal less surprising than it appears to be at first sight.

In the last paragraph but one, on p. 589, Mr. Leak says that the average rate of duty charged was 18·5 per cent. in 1933. This rose to 19·4 in 1934, and has since declined to 19·3 and 19·1 per cent. in the past two years, the reduction in the average rate since 1934 being due in the main to changes in the iron and steel duties and to the varying make-up of imports, and in the next paragraph he says that there was apparently some increase last year in the level of the tariff. These two statements may be consistent, but the consistency is not very apparent, to me at least, and on the whole I am doubtful if the second statement is a correct conclusion. Of course the average rate of duty levied is in fact no real indication of the height of the tariff, considered as an instrument of industrial protection, or of restriction of imports, for that or any other reasons. What it does show is the average rate of duty borne by goods which managed to find the way in despite the tariff. I doubt if it really does anything more. There could be a rate of duty on a class of goods so heavy as to prohibit importation: in that case the imports would disappear and the revenue disappear: both those would vanish from the calculation, and one might be left with the same average rate of duty levied as before, though it would be indisputable that the level of the tariff had been raised. On the whole I confess that I have very great doubt as to the practicability of any simple statement as to the level of a tariff. Its relative level in time or as compared with the tariffs of other countries is a different matter and perhaps more readily capable of a simple indication, though the discussion at the proceedings of this Society eight years ago last month shows the pitfalls which beset even that.

But I am wandering into fields which I intended to avoid. I return gladly to the narrow path, and end by repeating my appreciation of Mr. Leak's paper—an appreciation which I am sure will be shared by all who from whatever point of view are interested in the statistics of British trade and industry and the general problem of the tariff.

MR. BIRKETT: It gives me very great pleasure to have this opportunity of speaking on Mr. Leak's paper and paying my tribute to its interest and importance. I think I ought to say at once that Industry feels itself exceedingly fortunate in having as the chief statistician at the Board of Trade so worthy a successor to Sir Alfred Flux as Mr. Leak. Mr. Leak does, I know, appreciate the necessity for the prompt publication of the statistics for which he is responsible, and we are grateful for the improvement which is taking place in this direction.

Mr. Leak gives his paper a very wide title—"Some Results of the Import Duties Act"—of which I propose to take full advantage. It is only at the end of the second paragraph that he suggests the limitation "so far as such effects are shown by the trade returns and the reports of the Import Duties Act Inquiries, 1933 and 1934." But before discussing the results of the Import Duties Act so far as they relate to the particular industry in which I am most interested, I should like to join issue with him on one statement in his paper. The excellent paper to which we have listened fully justifies him in saying that the material was "worthy of analysis," but does it justify him in adding, "in a manner that would not be suitable for inclusion in a Government publication"? In my view there is little, if anything, in the paper not suitable for publication in the *Board of Trade Journal* or the final report on the Import Duties Act Inquiries. Mr. Leak is, as he says himself, "a statistician in the fortunate position of having firsthand knowledge of the material on which he is working." Who is better fitted than the statistician with firsthand knowledge of the material to write the reports on that material? and why should he not write in Government time and for a Government publication? In spite of the improvements which have taken place in the statistical publications of the Government, there are still too many statistics which are left to be interpreted by persons *without* firsthand knowledge of the material on which they are working. Mr. Leak and other Government statisticians require a few more able helpers, so that analyses such as he has given us shall not depend upon the scanty leisure of overworked officials or be left in less competent hands if they are to be done at all. From the point of view of this Society, one of the most important results of the Import Duties Act is that we now have what virtually amounts to an annual Census of Production. A no less important result is the series of excellent reports on various industries published by the Import Duties Advisory Committee which has enabled the country to appreciate, as never before, the importance of Industry in the national economy.

I would now like to apply the title of the paper to iron and steel. Iron and steel was always what might be termed the spearhead of the tariff controversy. The benefits that might accrue from the imposition of a tariff on iron and steel were always contrasted with the harm that would be done to the products which depended upon iron and steel, but we never knew the extent to which they depended upon iron and steel, and I am delighted to see that the mutual interdependence of industries will be brought out as the result of the enquiries which Mr. Leak is making, for he has provided for information regarding the consumption of the principal materials by each of the chief producing industries.

In the depth of the depression in 1931 steel production had fallen to 5,202,000 tons; a figure, except for those years in which production was handicapped by disputes in the coal industry, lower than in any year since 1904. Production this year will amount to 12¾ million tons or 145 per cent. more than in 1931. This has naturally had its effect on employment, and the percentage of unemployed workers in the industry has fallen from 50 per cent. in May 1932 to about 11·7 per cent. this year.

The change which has come over the industry cannot be attributed to any single cause, any more than the depression which preceded it.

In addition to the imposition of tariffs, there are the agreement with the International Steel Cartel and the re-organization and improvement of equipment which are taking place within the industry, both of which are largely due to the encouragement of the tariff, and particularly, the relief afforded to the economic system by the departure from the Gold Standard. The Gold Standard was abandoned in September 1931 and protective tariffs were introduced shortly afterwards.

The story of the recovery of the British iron and steel industry dates from these two circumstances. As I have just said, production in 1931 had fallen to 5,200,000 ingot tons, and in 1932 it was only fractionally better. In 1933 there was a substantial jump to 7,000,000 tons, which further increased in 1934 to 8,850,000 tons; in 1935 to 9,860,000 tons; in 1936 to 11,780,000 tons, while this year we confidently anticipate we shall produce 12,750,000 tons. While a large part of the increase has been due to an increasing home demand, it should be noted that there has been no unfavourable repercussion on the balance of exports over imports—the export balance of iron and steel and its manufactures has risen from 700,000 tons in 1930 and a minus quantity in 1931 to a rate of 2,300.000 tons at the present time. There can be no doubt that tariffs have been a principal although not the only factor in the recovery of iron and steel.

In the first report of the Import Duties Advisory Committee (April 1932) which led to the imposition of a 33⅓ per cent. tariff on iron and steel, it was stated "we are satisfied that the maintenance of a prosperous iron and steel industry in the highest degree of efficiency is essential to the economic progress of the country." In order to ensure that the effect of tariffs should not militate against efficiency, but contribute to it, the Chairman of the Import Duties Advisory Committee (now Lord May) invited the industry to set up a "National Committee" to, as he put it, "set its house in order."

The Agreement with the International Cartel was signed on July 31, 1935, and provided that imports of controlled products from cartel countries—Germany, France, Belgium and Luxemburg—which had amounted to rather more than 900,000 tons in 1934, should be reduced to 670,000 tons in the first year of the Agreement and 525,000 tons thereafter. The duty on imports from cartel countries was reduced to 20 per cent. In order to facilitate the working of the Agreement, a licensing system was instituted in November 1936. So much importance was attached to licensing that the Agreement included a clause for its termination if a licensing system was not instituted. The effect of a limitation of imports into this market would have been largely nullified had the cartel countries been allowed to divert their surplus tonnage into other markets, and the Agreement therefore provided for export agreements to be concluded covering the various sections of the trade. The broad principle of all the Sectional Agreements was that exports to neutral markets should be divided between the United Kingdom and the cartel in the same proportions as in 1934.

Having given the industry a protective tariff and helped it to secure a limitation of imports from the Continent, the Government was very conscious of the danger of prices rising unduly, and during the course of negotiations with the cartel, the Federation gave the following assurance:—

> "With costs of production being subject to variations in the price of ore, coke and scrap, the level of wages and possible variations in the general price level, any absolute guarantee in regard to a particular level of price is of course impossible; but the Federation categorically renew the assurance given by their representatives to Ministers on 4th March that it is not their intention to raise prices as a result of increased protection. They will continue to adhere to the policy of low prices and increased efficiency, and use the higher tariff as an instrument for securing an international agreement which will obtain for this country a reasonable proportion of export trade under profitable conditions."

In order to implement this pledge the steel industry has undertaken to justify its price increases to the Import Duties Advisory Committee, to whom it submits audited costs of production.

I have great pleasure in seconding the vote of thanks to Mr. Leak.

MR. GLENDAY joined in expressing gratitude to Mr. Leak for his valuable paper. Like Sir Percy Ashley, he felt doubtful whether it was yet practicable to draw sound conclusions as to the effect of the new tariff. He would like to suggest that before it was possible to judge the effect of the imposition of a tariff system it was necessary, first of all, to take into account the general pattern of the organization of the country concerned—whether, for example, it was predominantly agricultural or industrial, or a mixture of both—and, in the second place, to take note of general world conditions at the time of its introduction.

On p. 538, Mr. Leak ventured to contrast the effect of a tariff on a highly industrial country like Great Britain with that on a primary producing agricultural country. The comparison seemed to him not quite fair. The adoption of a tariff by an agricultural country in order to establish secondary industries could not be compared with the adoption of a tariff by a country *already* industrialized and desiring to extend its secondary industries. In the former case a considerable period must lapse before the tariff could achieve its purpose, whereas in an industrialized country there would be a large number of border-line industries in which a relatively slight change in prices or economic environment might tip the scale in their favour. A much better comparison for Mr. Leak's purpose would surely have been to contrast the effect of the agricultural tariff policy of this country with the industrial tariff policy of overseas agricultural countries. The reference to the tea and tobacco duties in this connection was not quite clear; the duties were revenue duties and there was no question of stimulating the production of these commodities in this country. Throughout his paper Mr. Leak made no distinction between the 10 per cent. revenue duty and the additional, *i.e.* protective, duties, or between competitive imports and non-competitive imports; this seemed a pity.

In judging the effect of a tariff, account must also be taken of the condition of the world environment in which it was to operate. He would like to take strong exception to Mr. Leak's description of 1930 as a normal year. There were three material reasons why 1930 could not be considered a normal year. 1930 was a year in which the great slump began. It was thus a transition year, a period of doubt, when no man could say how serious that world depression was going to be. A second disturbing factor was our monetary policy, which culminated in our departure from the gold standard in the following year, an event which completely altered the situation of this country *vis à vis* many other countries. Many people alleged that the benefits ascribed to the tariff were in a large measure a consequence of the depreciation of the pound sterling. Thirdly, the attitude of world countries towards one another was in the process of change, as also was their attitude towards the tariff as an instrument of trade policy. In many respects the tariff was becoming an obsolete weapon. In these days control over the flow of goods was being exercised in increasing measure by import quotas, exchange restrictions and the like. In particular, mention must be made of the widespread movement towards the formation of international cartels and price arrangements. So far as these arrangements were concerned, tariffs were only a means to an end.

This was illustrated by the case of the British iron and steel industry referred to by Mr. Birkett. The prime purpose of the tariff on iron and steel was to help the industry to become a member of the international cartel and play its part in operating the cartel arrangement. Similar use of the tariff was being made by other industries.

Mr. Glenday felt that the disturbing features he had just mentioned made him doubt the wisdom of trying to draw conclusions from data collected over the period covered by the present survey.

Mr. Glenday hoped that Mr. Leak would not think that anything he had said was intended to detract from the great value of his paper. For not only did he desire to accord it the heartiest welcome possible, but he hoped that it would prove to be only the first of a series of similar papers which, when linked together, would provide an intensely interesting contribution to the history of a time of revolutionary change.

MR. NORMAN CRUMP said it gave him great pleasure to support this vote of thanks, especially as he could do so from a slightly different angle from that of Sir Percy Ashley, Mr. Birkett and Mr. Glenday. The paper, very properly, considered the immediate effect of the tariff upon various industries, home products and imports, but one also had to consider it on wider grounds.

There were one or two points in the paper on which he was not quite clear. When Mr. Leak quoted prices of imported goods, Mr. Crump wished he had said whether these were cum-duty or ex-duty prices, as this was a matter of some importance. He brought this point out because, looking back to the old days of tariff controversies, one of the big points at issue was, how would a tariff affect the prices paid by the consumer, the man in the street. It would be asking too much of Mr. Leak to suggest that he should trace price movements right through to that point, as the price to the ultimate consumer was affected by many influences. Thus, there was the effect of the suspension of the gold standard a few months before the tariff was introduced, and from the theoretical point of view it would have been much more convenient if the introduction of the tariff had been deferred until the impact of the suspension of the gold standard had spent itself. For this reason alone, the paper did not and could not say whether the tariff had raised prices to the consumer.

Mr. Crump's next point was that the tariff came on at a time when prices had fallen, and the experience of this country, as well as of others, showed that under conditions of low prices it was necessary to think more of the producer and less of the consumer. Now, as Sir Percy Ashley had explained, the evidence laid before the Import Duties Advisory Committee came mainly from the producing end, or if from the consumers, from groups of consumers who bought one trade's finished products to use as raw materials for their own trade—that is, from consumers who were producers in their turn. Prices, however, were now rising, and so the needs of the consumer began to assume the greater importance. Was the Import Duties Advisory Committee bearing this new fact in mind whenever it came to collect evidence?

There was the other big side of the question which Mr. Leak could not attempt to bring out at all—the effect of the tariff and the Ottawa agreements upon the general diversion of world trade. This really called for a separate paper, and if it could be arranged for someone to produce a paper on the redistribution of world trade, and the impact of our own tariff and Ottawa agreements upon its direction, it would fill a vital gap in this study of tariffs and be of inestimable service. There was also the question of the trade balance of the country, and on the administrative side there was the question of how the Import Duties Advisory Committee weighed up the claims of different home industries and the wider claims which arose in trade negotiations with other countries.

Dr. Snow said that when he had noticed the sentence about the leather industry to which Sir Percy Ashley had referred, he had been surprised at the apparent exception of that industry to the rule of general increase in output per employee since 1930. In recent weeks he had had occasion to hear much from Trade Union officials about the speeding up of production in that industry, and he naturally wondered if the observations of the Trade Union officials were in error, or whether there were possible fallacies lurking in the statistical treatment of the data. He thought that the existence of some fallacies was possible. There were some of interest only to those concerned with the industry itself, but there was one which he considered of general importance to which he would like to refer, and that was the question of statistical duplication in the returns. Mr. Leak referred to the matter in the first paragraph of the section on "Volume of Production," and said, "In connection with the 1930 Census of Production the question of changes between 1924 and 1930 in the amount of duplication was looked into for all the principal trades, and the results were published in the final report on the Census. Subsequent to 1930 there is no reason for thinking that there was any substantial change in the amount of duplication." Dr. Snow felt that it would be of very great value if Mr. Leak would, on a suitable occasion, say more about this subject. People who were not in a position to have first-hand knowledge of the pitfalls of the statistics of the Census of Industrial Production used the published figures without being aware of the artificial character of the phrase "gross production," and very good work would be done if the subject could be formally treated at greater length than had been the case hitherto. The report of the Census for 1930 to which Mr. Leak referred said: "The gross value of the output returned by a given trade cannot be interpreted as necessarily expressing the value of the production in the form in which it passes out of that trade, since in most cases inter-sales of goods between firms in the trade will have led to some duplication of record. . . . The aggregate of all the gross output values recorded by the Census must, therefore, considerably overstate the value of the goods considered as a whole when ready for export or consumption." The bearing of this matter on Mr. Leak's table of "Volume of output per person employed in certain trades" was that the figures might be appreciably modified if there was a substantial change in the amount of duplication within an industry during the period covered. Remembering the great changes which have occurred in industry in recent years, it seemed most unlikely that the proportion of this duplication had been unchanged. It was, in a number of cases, quite impossible to make estimates of it with any degree of exactitude with the data at present available, as the report of the 1930 Census itself pointed out. In the case of the leather industry, estimates had been made, indicating that in 1930 the duplication *for which information was available* was 10·1 per cent. of the gross output, while there was certainly some more duplication for which statistical information was not available. In 1934 the known portion had increased to 12·2 per cent., and he considered it quite likely that the unknown portion had also increased. Without further light on this subject, therefore, he thought it would be wise not to stress very much the figures set out in Appendix II of Mr. Leak's paper.

On the subject of the general conclusions of the paper with regard to the effect of the tariff, Dr. Snow referred to one paragraph which he considered summarized extremely important facts. This was (on page 573) "The table shows an increase of some 20 per cent. between 1930 and 1933 in imports of dutiable goods from British countries, and a decline of 57 per cent. in imports from foreign countries. Home production of these goods increased by 6 per cent. between 1930 and 1933, showing that the tariff would appear, up to 1933, to have benefited the Dominion manufacturer to a greater degree than the home manufacturer." There was no doubt that since 1934 the movement had continued in the same direction, and he thought that when Mr. Leak gave the Society another paper summarizing results up to 1937, it would bring out again how valuable the tariff imposed in 1932 in this country on foreign goods had been to manufacturers in the Dominions who were able to send their goods into this country free of duty. In conclusion, he associated himself with other speakers in congratulating Mr. Leak on this paper. He expressed the hope that a similar paper from Mr. Leak would become, if not an annual, at any rate a biennial event in the Society's records.

Mr. Ellinger agreed with Mr. Glenday. He did not know to what extent the results shown by Mr. Leak were the results of the tariffs and to what extent of the depreciation which had taken place in sterling.

With reference to Mr. Crump's remarks, he, too, would like to see a further paper which would put the whole question on wider lines. He would go a step beyond. On looking at Table XIII, it would appear that production declined about 50 million pounds and exports declined about 50 million pounds also, so that obviously the country did not produce the 50 million pounds which had previously been exported. On the other hand, the British goods in the home market remained stationary. The total goods in the home market fell by 50 million pounds because the retained imports were 50 million pounds less: therefore no more British goods were produced, but 50 million pounds of exports were lost. 50 million pounds' worth were not imported, and the total consumption went down by 50 million pounds. There were probably differences in value, but if the values remained the same it would be seen that the nation

Consumed 50 millions less
Imported ,, ,, ,,
Produced ,, ,, ,,
Exported ,, ,, ,,

so that it might be described as a "wash out." Would it really have been so? This was where he would like Mr. Crump's idea extended. The country did not export these 50 million pounds, so did not earn anything on the freight, insurance, or finance for the City of London. It did not import 50 millions, so did not earn the freight, insurance, or finance. Further, there are some countries which owed us money, and which found great difficulty in paying their debt to us. In so far as we have been in the habit of importing part of this 50 million pounds from them, we were withholding from them their means of payment, for they had no gold, and could only pay by their exports. The consequence was that in endeavouring to balance their indebtedness, they restricted their imports and put on all kinds of exchange restrictions, and yet in many instances they had to default.

Mr. Woolcock said that as the President had kindly invited guests to say a word or two, he would like to do so on their behalf because they had all enjoyed it very much.

He was not a statistician—not even a statistician of the kind Dr. Snow had referred to as an " academic statistician " or " abstract statistician " : there was nothing really abstract about him. He did feel on coming to the meeting that he would not only enjoy himself, but would gain very considerably by accepting the invitation of Sir Percy Ashley, and they had certainly had a most interesting paper, and were much indebted to Mr. Leak.

Two things had occurred to him, while listening to what had become almost a political discussion. For the first time he had been given some statistical proof that the theory that the minute a tariff was put on prices of everything would go up instantaneously, did not quite hold. Mr. Leak gave a good deal of statistical evidence that what most people had feared had not in fact happened, and that the country was not suffering in this respect quite as badly as was anticipated. On the second point, he found it very difficult to see how Mr. Leak was going to carry his investigation still further into the realm of the prices paid by consumers.

On behalf of the visitors, Mr. Woolcock expressed his thanks to Mr. Leak for his valuable paper.

MR. LEAK in reply said: Beginning with Sir Percy Ashley's comments, I should like to have included a number of the 1935 figures, but time simply did not permit. In any case, the figures are not yet all complete. If I could have had a run of three years, instead of two, the paper would have been considerably better, because one might have carried the investigation of prices and restriction of imports a little further. But not having got them, I could not use them.

Sir Percy asked what the difference was between the clothing trade mentioned on page 559 and the clothing trades included in the table on page 560. The clothing trade relates to the manufacture of outer garments and under garments of woven materials—suits, dresses, etc.; the clothing group of trades includes a number of other trades such as boots and shoes, gloves and hats, which are covered by the Import Duties Act Inquiries.

He mentioned the last two paragraphs of the paper, and said he did not like my final conclusion that there was some increase last year in the height of the tariff. Then he proceeded to criticize the conclusion in the preceding paragraph, and said that you could not correctly calculate the height of the tariff by its incidence upon the imports. That is just what I said myself in the last paragraph but two. I was able to make an accurate comparison between 1935 and 1936, because I applied the tariff at the end of each of the two years to the imports in one year, and by this means I got rid of the restrictive effects of the extra tariff. It is possible in this way to measure changes from year to year, though there is no standard year which could be used for measuring the absolute height of the tariff. The figures in Appendix V lead to the very definite conclusion that last year there was some increase in the height of the tariff, and nothing that Sir Percy Ashley said to-day seems to throw any doubt upon that conclusion.

As regards Mr. Glenday's remarks about the year 1930, I fully agree that 1930 was not by any means a normal year, nor did I so describe it, but it so happens that 1930 was as normal a year as any other for the volume of imports of manufactured goods.

Mr. Crump asked how imported goods were valued. The value is of course as it was declared by the importer, and not after duty was paid; the value is substantially the c.i.f. value—actually the value for duty purposes.

Dr. Snow referred to the subject of duplication. As indicated on page 562, I considered the bearing of this question on the volume of production in 1933 and 1934 in relation to 1930. I had expected that, with the substantial changes that took place subsequent to 1930 and the slightly different method we adopted in collecting the returns in 1933 and 1934, there might have been considerable changes in the amount of duplication shown in the returns. On looking into the matter in detail, however, I found that there was no change of such magnitude that it was necessary to take it into account. The figures showing the volume of production per person employed are necessarily only very approximate, and the change of about 2 per cent. in the volume of production for the leather trade resulting from the somewhat greater duplication in 1934 than in 1930 does not invalidate the statement that the output per person employed in this trade was substantially the same in each of the four years for which information is available.

I fully appreciate the difficulty of ascribing to the tariff effects which may have resulted from the suspension of the gold standard. The immediate effect apparent after that action in September 1931 was an enormous increase in imports, the expectation that a tariff might be imposed later leading to this result. There was no general increase in sterling values of imported manufactures, such as might have been expected to follow the depreciation of sterling in terms of many other currencies. In the circumstances I am not disposed to attach too much weight to the suspension of the gold standard on either the volume of imports or the average values of imports. The effects may be attributed in the main to the differential tariff.

I am very grateful for the kind remarks made by the various speakers. Apart from the general question that some of the views expressed in the paper, and the statistical analysis leading to those views, are hardly suitable for inclusion in a Government publication, there is a definite advantage in presenting such an analysis in a paper before this Society, in that it enables the methods and conclusions to be criticized by the Fellows and visitors present when the paper is read; also the paper probably reaches a wider circle than it would otherwise do.

As a result of the ballot taken during the meeting the candidates named below were elected Fellows of the Society:—

Mohamed Riad el-Shanawany.
Olive Elizabeth Poulton, B.Sc.(Econ.).
Pei-Ching Tang, Ph.D.

MISCELLANEA.

CONTENTS.

PAGE
The Agricultural Labour Bill in England and Wales. By R. J. THOMPSON, C.B. 607
A Simple Method of Deriving Demand Curves. By E. J. BROSTER ... 625

THE AGRICULTURAL LABOUR BILL IN ENGLAND AND WALES.

By R. J. THOMPSON, C.B.

IN the interesting and valuable paper on "The Labour Bill and Output on Arable Farms" by Dr. R. McG. Carslaw and Mr. P. E. Graves (*Journal R.S.S., Part IV*, 1935) the authors express doubts as to the possibility of obtaining any similar details applicable to England and Wales as a whole. Official reports and other publications provide, they observe, much useful information, "but do not make it possible to compute the total amount paid by the industry in the form of wages, because statistics of the numbers of workers in the various wage-groups are not incorporated, while evidence on total payments for overtime and other extras is either scanty or non-existent."

This view seems to me unduly pessimistic. There is a good deal of information, which, while it does not by any means provide complete particulars on all aspects of the question, does go some distance in that direction, and is well deserving of examination.

I have, therefore, in the following note brought together such statistics as are available with the object of seeing what information they afford as to the numbers and classes of agricultural workers and their weekly and annual earnings. Incidentally, this provides the basis for a provisional estimate of the agricultural wages bill in England and Wales in recent years. Naturally, some gaps have had to be filled up with estimates, and the result cannot claim to be more than an approximation.

Numbers and Categories of Workers.

There are two sources of information as to the numbers of the land-working population, viz., the Ministry of Agriculture's annual statistics, and the Population Census. The particulars given in these two publications differ in practically all respects, and the first problem is to see how the annual and the decennial figures can be reconciled and used to supplement one another.

The figures published by the Ministry of Agriculture are based on the Returns made annually on the 4th of June by all occupiers of agricultural and horticultural holdings in England and Wales exceeding 1 acre in extent. In these Returns the occupier is asked to state the number of male workers under and over 21 years of age and the number of women and girls, actually employed on the date of the return, distinguishing in each case between "regular" and "casual" workers; the occupier, his wife, and domestic servants are to be excluded, but sons, daughters and other relatives working on the farm are to be included. The making of the return should not, therefore, present much difficulty, as the facts required are simple and well within the knowledge of the person concerned. In the main, the figures show no very wide fluctuations from year to year (that is, between any two adjoining years), and may be assumed to be substantially accurate. There is no further division by occupation.

For comparison with the Population Census, the Ministry's returns for the year 1931 as regards males are given below. The number of women and girls will be referred to later.

Males.	Regular.	Casual.	Total.
21 years and over	435,000	62,300	497,300
Under 21 years	117,000	9,300	126,300
	552,000	71,600	623,600

In the Census schedules the statements were made by the "head of the household," who was required to give the occupation of each person returned, and the name of employer, and if out of work; the results were classified under "occupations" and also according to the employer's business under "industries." It is worth noting in regard to these figures that the Unemployment Insurance Statutory Committee, in reporting on agricultural insurance in 1935, observed, "There is no serious reason for supposing that those classified as belonging to the agricultural industry, whether as in work or out-of-work, are persons who ought properly to be entered elsewhere."

Taking the "Industries" classification first, the number of workers employed and the number out of work in the industries included under the general heading of Agriculture (excluding forestry) are as follows :—

Males (14 *years and over*).

	No Employed.	No Out of Work.	Total
Farming and stock-rearing	529,957	42,210	572,167
Poultry farming	8,771	624	9,395
Market gardening and fruit-farming	23,076	5,004	28,080
Flower and seed-growing and nursery-gardening	34,902	3,086	37,988
Other gardening	5,567	2,312	7,879
Other agricultural industries ...	1,654	386	2,040
	603,927	53,622	657,549

These figures may be compared with those in the "Occupations" tables. The latter, however, present more difficulty as they include under the general heading of "Agriculture" some 160,000 gardeners and 47,000 gardeners' labourers, two categories which cover men in private employment, park gardeners and some others who would not be included either in the "Industries" tables or in the Ministry's returns. The only clue to their numbers is contained in the Report of the Unemployment Insurance Statutory Committee, where it is stated that the figures *for Great Britain* include 108,804 gardeners and 17,682 gardeners' labourers "in private domestic service." Making a proportionate deduction, there would still remain in England and Wales some 89,700 gardeners and gardeners' labourers (including park gardeners and others), as compared with about 74,000 persons given under the horticulture headings in the "Industries" tables. Some adjustment is therefore necessary, and the best course seems to be to use the "Industries" figure and to divide this total of 74,000 proportionately between the two categories of "gardeners" and "gardeners' labourers." Subject to this adjustment, the number of workers shown in the "occupations" tables of the Census, distinguishing those under and over 21 and those out of work, is as follows :—

	14–20.	21 and Over	Total (all Ages) In and Out of Work.	No Out of Work (all Ages).
Farmers' sons and relatives ...	27,145	45,448	72,593	169
Farm bailiffs, foremen, machine-drivers	620	17,508	18,128	1,171
Shepherds, cattlemen, horsemen	23,858	118,536	142,394	3,648
Agricultural labourers ...	76,547	258,043	334,590	38,651
Other agricultural occupations, including estate labourers	4,894	12,405	17,299	946
Gardeners and others engaged in horticulture	6,000	41,500	47,500	6,677
Gardeners' labourers	6,500	20,000	26,500	3,725
Total	145,564	513,440	659,004	54,987

Before going further, reference must be made to a criticism of the Census figures which is made by Dr. Carslaw in the paper already mentioned. "There seems reason to believe," he says, "that the classification as given in the Census [*i.e.* under the heading "Agricultural labourers not otherwise distinguished"] is unreliable, and that agricultural employees making their Census Return will normally be content to enter their occupation as 'Farm Workers' without specifying the particular nature of their work." I do not find this very convincing. One may reasonably argue that the skilled men who are more highly paid than ordinary agricultural labourers would wish to show the distinction in the Census Schedule, and that, as they are always known by such designations as shepherds, cowmen, stockmen, waggoners, etc., there would be no reason for them to adopt another and unusual title. Indeed, it seems to me highly improbable that a shepherd or cowman would call himself a "farm worker."

As evidence in support of his contention, however, Dr. Carslaw points out that according to the Census figures the ratio of "high-pay" workers to workers "not otherwise distinguished" is approximately 2 : 5, but that on the 1000 farms covered by the Eastern Counties survey the ratio was roughly 2 : 3. For other parts of the country, he says, the ratio should certainly not be wider than that found in the Eastern Counties.

As no figures are given, it is a little difficult to check this statement, but it must be admitted that the Census figures do show a lower proportion of persons coming under the definition "high pay" than is apparently the case with the Survey, though I should not put the ratio as high as 2 : 5.

Dr. Carslaw's 2 : 3 ratio seems, however, to be based on the proportion of workers permanently employed. In Table III of his paper, he shows "high-pay" workers as 42 per cent. of the total number of *regular* workers: if this is the basis of the 2 : 3 ratio, it must be pointed out that the Census figures include both regular and casual workers and men out of work, and that consequently the two sets of figures are not entirely comparable.

The accuracy of the Census classification is, of course, not a question which is subject to proof; not more than a reasonable approximation is to be expected, and, as will be seen later, the Census figures, when further analysed, do not in fact differ so very markedly from those obtained by Dr. Carslaw.

Taking the figures as they stand, the "Occupations" tables of the Census show that the total number of males of all ages in or out of work returned on April 29th, 1931, as normally occupied in wage-earning capacities in the agricultural and horticultural industries was 659,000, of whom about 585,000 or 88·8 per cent. were in agriculture and 74,000 or 11·2 per cent. in horticulture. Of these, 145,000 or 22 per cent. were boys and young men 14–20 years of age, and 514,000 or 78·0 per cent. were adults 21 years and over.

The total in the "Industries" tables is 657,500, so that practically there is no divergence between these two tables.

Taking the adults separately, exactly one half of the total were ordinary agricultural labourers; shepherds, cattle-men and horsemen formed 23 per cent.; farmers' sons and relatives 9 per cent.; farm bailiffs, foremen and machine-men, 3½ per cent.; other agricultural occupations (including estate labourers) nearly 2½ per cent., while the horticultural group accounted for 12 per cent.

A point to be noted in connection with this classification is that the heading "farmers' sons and other relatives assisting in the work of the farm" differs from the others in that it does not properly describe an occupation; the persons under this heading must in fact be performing duties which would bring them more or less exactly within one or other of the occupations.

The distinction between the occupations is much less marked in the case of boys and young men (14–20 years), and combining them in totals with the older men is apt to give a somewhat misleading impression. For instance, one naturally thinks of shepherds, cowmen, etc., as adults, and their pay and position are quite different from those of the boys and youths helping them in their work. It is therefore more in accordance with ordinary practice to treat the boys and youths as a separate class, instead of mixing them with the grown-up men. Taking them as a group, 19 per cent. of the total were farmers' sons and relatives, 72 per cent. came under one or other of the agricultural headings, and some 9 per cent. were employed in horticulture.

Of the total number of workers of all ages it will be seen that 55,000 were out of work at the date of the Census, so that the total number in employment was 604,000. The numbers in employment are not divided according to age and occupation, so that it is not possible to say exactly how the numbers unemployed were distributed by age in the different classes.

Comparing these figures with those shown in the Agricultural Returns, the first point to be noted is that the latter give the total number actually employed on June 4th—that is, nearly six weeks after the Census enumeration—as 624,000, or 20,000 more than the Census figure. If we assume that 20,000 out of the 55,000 unemployed in April had in the meantime got work, the two sets of figures are in agreement. As June is one of the busier months on the land, this assumption seems a reasonable one.

Comparison can also be made by age, and here again there is fair agreement: the Returns showing 127,000 or 20 per cent. as boys and youths under 21 years and 497,000 or 80 per cent. as adults over 21 actually employed in June, whereas the Census shows an aggregate in and out of work of 145,000 or 22 per cent. of the younger ages and 513,000 or 78 per cent. in the adult groups. As the division by age, whether in the Census or in the Returns, is inevitably somewhat of an approximation, the small difference in these percentages does not seem important. Of the two, the division by age in the Agricultural Returns is more likely to be correct, as the wages prescribed under the Agricultural Wages Act rise at the age of 21, and consequently workers' ages are likely to be known to farmers making the return.

In view of the similarity between the two sets of figures, I think we are justified in assuming that they do in fact refer to the same persons.

That being the case, we may reasonably infer that the persons included in the Annual Returns were distributed by categories in much the same proportions as they were in the Census. For example, since the Census classification shows that agricultural labourers (in and out of work) formed about 50 per cent. of the adult workers, the probability is that the proportion of this class shown in the Returns as actually in employment will be approximately the same.

This gives a somewhat clearer conception of the Returns than is afforded by the crude figures; as they stand they give merely a total of "workers," a total which is frequently spoken of or regarded as though it consisted entirely of agricultural labourers, whereas, in fact, it covers all classes. The way in which this distribution works out is shown later.

Moreover, although the figures apply in the first instance to the year 1931, it is not unlikely that the proportion of the various groups will remain relatively unchanged for some years. There is, of course, no means of knowing whether this is so, and the fact that the total number of workers has altered appreciably in recent years makes it rather less probable than would otherwise be the case. But, in default of more exact information, these proportions afford a provisional indication of the distribution.

The Agricultural Returns also make a distinction which is different from "occupations" by dividing the numbers into two classes, "regular" and "casual," the latter numbering 62,000 adults and 9,200 under 21 years of age. These casual workers are defined as "persons taken on temporarily for work of a seasonal nature and persons employed on the holding for only part of their time." Presumably, in most cases, they are of the same class as the regular workers, the distinction merely being that they have not been fortunate enough to secure regular employment. On the other hand, men such as thatchers, hedgers and ditchers who do piece work, and also other workers who prefer occasional work or have some other sources of livelihood would be included.

Practically none of these casual workers would come into the first three groups shown in the above table, but we cannot quite confidently assume that they are all in the agricultural labourer class. The rate of unemployment is high in the latter class, and higher still in the horticultural group, which is pretty good evidence that "casual" men are included in both. The fact that there are many casual men in the latter industry is shown by a Report * which states that in 1935 there were 8,800 casual workers employed in connection with crops grown under glass. Some of these were apparently also employed part of their time in other agricultural operations.

When we turn to the corresponding information in regard to women and girls, we find an entirely different situation, as the figures in the Census tables show complete divergence from the Ministry's Returns, the latter giving a total of 93,000, while the former show only about 37,000. In the "Occupations" Tables the same adjustment is necessary as in the case of men, but subject to that the figures from the three sources are as follows:

Agricultural Returns 1931.

Women and girls :	Regular	64,400
	Casual	28,700
		93,100

Census "Industries" Tables

	No. Employed.	No. Out of Work.	Total.
Female Operatives (all ages) :—			
Farming and stock-raising ...	25,527	1,439	26,966
Poultry farming	1,461	46	1,507
Market-gardening and fruit-farming	2,919	206	3,125
Flower and seed-growing, nursery gardening	5,522	285	5,807
Other gardening	101	16	117
Other agricultural industries ...	95	5	100
	35,625	1,997	37,622

Census "Occupations" Tables

Total number of female operatives employed (all ages) ...	35,350
Number out of work	1,892
Total	37,242

---

* *The Output of Glasshouse Crops: Agricultural Market Report*, Ministry of Agriculture, February 26th, 1937.

It will be seen that while the Agricultural Returns show 64,000 women in regular employment, the Census accounts for only 35,000. The explanation probably is that the 64,000 women workers include a number of women engaged in such tasks as milking, butter-making, etc., who, though regularly employed, are not *whole-time* workers, and who appear under some other heading in the Census. Some may be partly engaged in domestic work and be described on the Census form under some vague term such as "Maid," and others may be the wives of labourers, etc., who appear in the Census as "Married women."

The Agricultural Returns also show 29,000 "casual" women workers, who find no place in the Census. This is not surprising, as women employed from time to time on field work would not regard this as a definite occupation to be entered on the Census form, more especially as in April seasonal work of this kind would hardly have been started. This view is supported by the fact that the rate of unemployment in the Census figures is only about 5 per cent.; if the casual class were included to any appreciable extent, it could not fail to be much higher at that time of the year.

On the whole, we may perhaps reasonably infer that the 93,000 women and girls shown in the Agricultural Returns consist of some 35,000 regular whole-time workers (*i.e.* the number returned in the Census), of 29,000 part-time workers regularly employed and of 29,000 casual workers.

Of the women in and out of work, who according to the Census numbered some 37,000, about 8,200 or 22 per cent. were farmers' daughters and other relatives, 6,600 or 18 per cent. were engaged in dairying, etc., 11,200 or 30 per cent. were returned in the agricultural labourer class, and 9,000 or 24 per cent. were in horticulture. Rather more than one-third of the total appear to be girls and young women 14–20 years of age.

This seems to be all the information which can be obtained from official sources as to the number of persons engaged in wage-earning capacities in the agricultural and horticultural industry in the Census year, but before leaving the subject it is worth glancing at the changes shown in the Agricultural Returns in the years preceding and following the Census.

As would be expected, there have been definitely fewer persons employed in the recent years of depression than in the more stable period which preceded them. The number of regular workers showed little change from 1925 to 1929, whereas since then there has been a steady decline. The decline was proportionately much greater in the younger classes, for whereas the regular men over 21 numbered about 11 per cent. less in 1936 than in 1925–29, the drop in those under 21 was about 24 per cent., a difference which may mean that younger workers are becoming reluctant to enter the industry. Another possible explanation is that quite young boys are less employed than formerly. In the same way, the number of casual male adult workers diminished by 26 per cent., while the reduction in the younger classes of casuals was 50 per cent. The employment of women and girls declined by about 30 per cent.

The averages of two periods 1925–29 and 1930–34 are shown below, with the two subsequent years 1935 and 1936 added for comparison.

	1925–29.	1930–34.	1935.	1936.
Regular male workers :—				
21 years and over	451,300	427,700	413,100	401,500
Under 21 years	132,300	114,400	104,700	100,700
Casual male workers :—				
21 years and over	78,500	69,500	67,800	57,900
Under 21 years	16,900	9,900	9,200	8,000
Women and girls :—				
Regular workers	64,000	61,000	50,100	44,600
Casual workers	40,200	29,400	28,300	27,800
Total	783,200	711,900	673,200	640,600

The loss in labour power has been presumably made good by the use of machinery, by the neglect of work which was not absolutely necessary, and by changes in the systems of farming which enable production to be carried on with fewer workers. A small part of the total reduction since 1925 would also be accounted for by the decline in the agricultural area.

Weekly Wage Rates and Earnings.

The next question to be considered is the wages and earnings of these various groups of workers. As regards wages, a reliable basis in the case of several grades of workers is afforded by the fact that weekly minimum wages are fixed by local Committees under the Agricultural Wages Act. In estimating actual earnings, however, allowance has also to be made for extra remuneration for special work, such as harvesting, etc., and for ordinary overtime. Some workers also receive wages in excess of the minimum of their grade in respect of greater skill and experience. Another feature of the same problem is how far these weekly earnings can properly be multiplied by 52 in order to arrive at the average annual income of the worker or to estimate the total payments by the employer.

The average minimum weekly wage rate for ordinary adult male workers over England and Wales as a whole is calculated annually by the Ministry of Agriculture, and stood for a number of years up to the summer of 1931 at approximately 31*s.* 8*d.* per week. The week is usually reckoned as 48 or 50 hours, though the number of hours, as well as the weekly rate, varies from county to county.

From the middle of 1931 reductions began to be made which lowered the average to 31*s.* 4*d.* in March 1932, and finally to 30*s.* 6½*d.* in November 1933. Since that date the average has risen to 30*s.* 11*d.* in September 1934, to 31*s.* 10*d.* in September 1935 and to 32*s.* in April 1936; and is still on the upgrade. The reduction in wages in 1931–32–33 was, of course, the result of the depression in agriculture which led farmers to pass on to their workers some of the effects of the drop in prices.

No exhaustive information is available as to the additional earnings referred to above, but an approximate indication is afforded by calculations made by the Ministry of Agriculture of the wages (including earnings) actually paid on farms visited in connection with the observance of the Wages Act. These varied slightly from year to year, but from 1928 to 1933 they showed that in some 20,000 cases the average additional earnings, including wages above the minimum, were sufficient to raise the minimum wage by about 2*s.* per week (ranging from 1*s.* 10*d.* to 2*s.* 3*d.*). This is a moderately substantial sample, though it is not necessarily representative either as regards distribution over the country or types of farms. The records are, in fact, considered to have a bias on the low side, as the farms visited are in many cases those in respect of which complaints are received, so that if the averages had been ascertained on a wider and more representative basis, they would probably have shown a rather higher figure.

Some similar figures are provided by Dr. Carslaw's survey which show that with an average minimum wage of 29*s.* 11*d.* the total earnings of ordinary adult workers in the Eastern Counties in 1931–33 were 32*s.* 2½*d.* per week, thus giving a sum of 2*s.* 3½*d.* for extra emoluments.

On the evidence from these two sources I have taken the average total earnings (including wages above the legal minimum) of male adult labourers in England and Wales as being in round figures about 34*s.* per week (*i.e.* 31*s.* 8*d.*, the minimum wage, plus 2*s.* 4*d.*) up to and including 1931. There was a small reduction in wages in the three following years, and a subsequent recovery to the former figure or higher. There is, however, some indication of a falling off in the amount of the extra emoluments in 1934 and 1935.

In the case of the more skilled classes of workers, *i.e.* shepherds, cattle-men, horsemen, etc., the Ministry makes no general estimate of the average minimum wage, and the method of payment is by no means uniform. In a number of counties special rates are fixed covering usually about 60 hours work weekly, and for these the average of various grades is about 38*s.* exclusive of any overtime or extra earnings, but there are also counties with different arrangements which seem to give higher rates. In other counties, men in these classes are paid the rates for ordinary labourers, with overtime for the longer hours involved. The Ministry, however, as in the previous case, quotes results ascertained on certain farms visited by Inspectors which over a number of years average about 37*s.* 1*d.* for horsemen and 38*s.* 10*d.* for stockmen, the highest figures being 37*s.* 5*d.* and 39*s.* 5*d.* respectively. These cover in all some 17,000 cases, and the average of the two grades is 38*s.* per week.

Owing to the circumstances in which they are ascertained, these results have a bias on the low side, and this is probably more marked in the case of these classes than with the ordinary agricultural labourers, so that in the absence of any more exact information I propose to take 39*s.* per week as the average earnings of the group. This seems justified by the fact that the minimum wage in a number of counties is 38*s.*, while a proportion of these skilled workers are certainly paid above the minimum and also have opportunities of earning extra money for lambing, calving, etc. It is moreover only 5*s.* above the average figure taken for the ordinary agricultural worker, and covers much longer hours.

With regard to the small group of men classed as bailiffs, machinemen and foremen, there is very little information. Foremen and bailiffs may earn anything from 40*s.* to £5 to £6 a week, and the men grouped under the heading of machine attendants are also of very various grades. Making what is no more than a rough guess, a figure between 45*s.* and 50*s.* seems probable or, say, an average of 47*s.* 6*d.*

If we take these special classes together, *i.e.* shepherds, stockmen, foremen, bailiffs, machine attendants, and weight them with the respective numbers of each shown in the Census, the average total earnings works out at 40*s.* Farmers' adult sons and other relatives may perhaps be put into this group as regards earnings; the work they perform must almost certainly be of the same nature, and, whatever they may actually be paid, they serve to replace men who would come within one or other of the categories included in the above classes.

Some confirmation of this figure of 40*s.* is given in Dr. Carslaw's paper, where it is stated that on the farms in the Eastern Counties coming within this enquiry the average earnings of "high pay" workers, viz. stockmen, horsemen, cowmen, shepherds, machine-drivers, and foremen, was 38*s.* 5½*d.* per week. The minimum wage-rates in these counties, however, were at least 2*s*. below the average for England and Wales, so that this figure is equivalent to about 40*s*. 6*d*. Another way of looking at this point is that the difference between the earnings of agricultural labourers and the more skilled classes in my estimate is 6*s*., viz. 34*s*. against 40*s*. In Dr. Carslaw's survey the difference is 6*s*. 3*d*., viz. 32*s*. 2½*d*. against 38*s*. 5½*d*.

The small group of "other agricultural occupations," including estate labourers, is more difficult to place. Some probably come into the more highly paid groups, and others are analogous to agricultural labourers. On the whole it seems safer to class them with the latter at an average wage of 34*s*. weekly.

There remains to be considered the horticultural class, viz. gardeners and gardeners' labourers. As regards the former, some information is afforded by the rates fixed in Hertfordshire some years ago for workers in glasshouses and on cucumber-growing, which ranged from 10*d*. to 11½–1*s*. per hour for 48–51 hours, with overtime at time and a quarter. As the higher rates applied to men with three years' experience, we may perhaps assume that a majority would be getting the higher rate, and take a figure of 47*s*. 6*d*. per week as an approximate average. As regards gardeners' labourers, their earnings may be taken at the same figure as those of agricultural labourers.

The figures quoted above refer in all cases to adults, over 21.

Minimum wages for young male workers are fixed according to age in the areas of 48 local Committees. For boys under 15 the average is 11*s*. 5*d*. per week, and for the two succeeding years 14*s*. and 17*s*. respectively; for ages under 18 the average is 19*s*. 4*d*. with 24*s*. 1*d*., 26*s*. 8*d*. and 29*s*. 8*d*. for the successive years up to "over 20 and under 21 years." Weighting these rates as nearly as possible according to the numbers at the different ages shown in the Census, we get an average weekly wage for boys and young men without distinction of occupation of about 20*s*. 10*d*.

The wages fixed for female workers by local Committees are in most cases on an hourly basis. The average throughout the country for adult women is put by the Ministry of Agriculture at between 5*d*. and 5½*d*., but in many areas these rates apply also to younger female workers. There do not seem to be any large number of girls under 17, so that an average of 5*d*. an hour is perhaps reasonable. On this basis, women in regular work would receive 20*s*. for 48 hours, while women in part-time employment, if engaged for 4 hours a day, would be getting half that sum. Casual women workers would be paid the same hourly rate. The amount of work these seasonal workers would be likely to obtain will be discussed later.

The rates mentioned above of 20*s*. 10*d*. per week for young male workers and of about 20*s*. for women may be compared with Dr. Carslaw's computation for "low-pay" workers in the Eastern Counties. This group of regular employees is defined as comprising "women, males under 21 years, and aged and incapacitated male workers over 21 years earning less than the minimum wage for ordinary workers," and the survey showed an average "cost to the employer" of 20*s*. 2*d*. per week. About 9*d*. of this would represent Health and other Insurance, the earnings being thus reduced to about 19*s*. 6*d*. As already mentioned, wages in the Eastern Counties are lower than the average for the whole country, so that allowing for this the two sets of figures are not dissimilar.

Annual Earnings.

The next question we have to consider is the duration of employment—that is, the extent to which the employment of the so-called "regular" worker was really permanent throughout the year. Prior to the recent depression, unemployment in agriculture was usually considered to have been very small, though the precise meaning of this expression was not defined. The slight variation which took place in the numbers of regular workers shown in the Agricultural Returns during the years 1925 to 1929 is some evidence that this was really the case, though there must, of course, always have been unemployment among casual workers.

The Reports of the Ministry of Agriculture for several years up to 1928 stated that there was no appreciable unemployment among regular farm hands, but from 1929 onwards these Reports make extensive reference to the prevalence of unemployment and to the "standing-off" of regular men in the winter months. For example, "The unemployment position during the winter (of 1929–30) was reported as being worse than for some years past, the most serious aspect being the standing off of regular farm hands who had never before felt the pinch of unemployment." The Unemployment Insurance Statutory Committee * at the end of 1934 summed up the position as follows: "Unemployment in agriculture was certainly worse in 1931 than for a good many years before, and continued to fall off in 1932 and the first part of 1933, but since then an improvement has set in."

There is no means of measuring the extent of this unemployment as the Census figures only refer to April 1931, and are consequently no guide to winter unemployment, as the men "stood off" would have been reabsorbed by the end of April, except so far as the reduction was permanent and not temporary. They show, however, that the special classes, *i.e.* shepherds, cattle-men, horsemen, were the

* Cmd. 4786. Report on Unemployment Insurance in Agriculture.

most permanent class of employees, as the proportion out of work was only 2 per cent., whereas the proportion among the agricultural labourers amounted to over 11 per cent. and among the horticultural to 14 per cent. If this was the case in April, the proportion in the worst winter months must certainly have been higher. How much higher cannot be stated: one can only infer from the statements quoted above that practically the whole of the "casual" class and also a proportion of the "regular" men were out of work for appreciable periods.

One small indication is afforded by the fact that between June 1930 and June 1931 the number of "regular" men shown in the Returns dropped by 11,000 and in the following year by 15,000; which suggests that these numbers were not only "stood off" during the winter, but also failed to be reabsorbed into the industry later on.

Dr. Carslaw does not deal very directly with this problem, though in calculating annual earnings of regular workers he allows one and a half week's loss of pay to ordinary and "low-pay" workers and one week's loss of pay to "high-pay" workers for time lost owing to illness and holidays. Apart from this he states that the amount of time lost to agricultural workers through being "stood off" is small. In the case of a large proportion this is still probably true, but in the light of the evidence quoted above it must have been much above normal in 1931–33.

To meet this point I have increased the above allowance to a fortnight, and have assumed that the regular agricultural labourers in work in June would receive pay for 50 weeks (that is, a loss of two weeks on the average for unemployment, illness, holidays, etc.). This would not, however, cover the special case of the men who dropped out of the industry entirely in the course of the year, and I have assumed that they only obtained 6 months work in that year. For the special classes, I assume 51 weeks work.

As regards casual male workers, Dr. Carslaw estimates that the number included in the official statistics obtain on the average approximately six months farm work in the year at the average earnings of agricultural labourers, and in the absence of other information I have adopted this figure. No particulars seem to be available for casual women workers: they probably obtain less employment than the men, and at a guess I have assumed three months work at an average of 20*s*. per week.

A point which has to be borne in mind is that the casual workers shown as employed in June do not represent the whole number of workers who did some work of an agricultural nature in the course of the year. The bulk of the hop pickers, for example, would not be included, and there is other seasonal work which gives employment of short duration. The figures assumed above for casual workers are, therefore, probably on the low side.

Estimate of the Total Labour Bill.

On the basis of this unavoidably lengthy analysis of the available information as to categories and earnings of workers on the land, we may now proceed to estimate the total labour bill in the year 1931–32. In order to make the calculation tolerably clear, I have set out in detail the numbers in the principal groups or classes of workers and their estimated weekly earnings. The numbers in the case of adult males are based on the Census percentages in the different occupations (as already given) applied to the numbers shown in the Agricultural Returns for 1931. The numbers of casual workers, of younger workers, and of women and girls are the numbers in the Returns.

Category.	Number.	Average Weekly Earnings.	Total for the Year. (£ thousands)
Adult Males.			
1. Farmers' sons and other relatives.	45,000	Average of categories 2 and 3, 40s. for 51 weeks	4,590
2. Farm bailiffs, foremen and machine-men.	17,000	47s. 6d.	2,059
3. Shepherds, cattlemen and horsemen.	114,000	39s.	11,337
4. Agricultural labourers and gardeners' labourers (excluding casuals).*	191,000	34s. for 50 weeks	16,235
5. Do. (the number leaving the industry in the course of the year).	15,000	34s. for 26 weeks	663
6. Other agricultural occupations, including estate labourers.	12,000	34s. for 50 weeks	1,020
7. Gardeners.	40,000	47s. 6d. for 50 weeks	4,750
8. Casual workers.	62,000	34s. for 26 weeks	2,740
Younger ages (14–20).			
9. Boys and young men in regular work.	117,000	20s. 10d. for 50 weeks	6,094
10. Boys and young men in casual work.	9,000	20s. 10d. for 26 weeks	244
Women and Girls.			
11. Regularly employed whole time.	35,000	20s. for 50 weeks	1,750
12. Regularly employed part time.	29,000	10s. for 50 weeks	725
13. Casual workers.	29,000	20s. for 13 weeks	377
Total—Male and Female	715,000		52,584

---

* The total number of agricultural labourers is estimated at 248,000 and of gardeners' labourers at 20,000; of this number 62,000 were casual workers and 15,000 left the industry in the course of the year, so that the number in regular work was 191,000.

This table gives an idea of the composition of the land-working population and their earnings so far as they can be reasonably estimated. Having regard to the size of the industry, the very small number of men earning more than £2 a week is noticeable, but this is presumably due to the fact that the managerial functions which would be more highly paid are discharged by the farmers themselves.

It will be seen that according to this estimate the aggregate earnings of the 715,000 persons employed in the agricultural (and horticultural) industry amounted to £52,600,000.

A simpler view of the distribution may be obtained by arranging the workers who were in practically continuous employment throughout the year in three divisions according to their scales of pay, viz. the more highly paid skilled workers, the ordinary labourers, and the younger workers, the women and girls. The corresponding figures of annual earnings and proportions in the different groups as ascertained by Dr. Carslaw in his survey of the Eastern Counties are added for comparison.

Regular Workers.	Nos.	Per Cent.	Average Annual Earnings.	Corresponding Figures given by Dr. Carslaw.	
				Per Cent.	Average Earnings.
			£		£
Skilled classes (including gardeners)	216,000	37·8	106	42	98·1
Labourers (including unspecified occupations) ...	203,000*	35·6	85	41	81·8
Boys and young men ...	117,000	26·6	52	17	48·9
Women and girls	35,000				
Total	571,000		84		83·0

* Excluding men who dropped out of the industry in the course of the year.

The similarity to Dr. Carslaw's figures of earnings has already been pointed out, subject to the proviso that earnings in the Eastern Counties are lower than in England and Wales as a whole. As regards the percentages of the three groups, it has to be remembered that Dr. Carslaw's sample was composed of arable farms, and did not include grass farms or specialized holdings such as poultry farms, market gardens or fruit farms, so that the conditions are not quite similar. Broadly speaking, however, the proportions are much the same. Evidently, the proportion of young workers and women employed on the farms in Dr. Carslaw's survey was below the average for the country, with the result that the percentages in the other two groups were raised.

The above figures refer to 1931–32, and since then there has been the reduction in numbers already mentioned. It is quite likely that the reduction has been almost wholly in the labourer class, and that the numbers in the skilled classes have not much changed. I estimate that at the present time about 40 per cent. of the workers regularly employed are in the skilled categories, 35 per cent. are ordinary labourers and 25 per cent. are boys, young men, women and girls.

One other point which may be mentioned is that Dr. Carslaw gives the proportion of family workers in the Eastern Counties as 14 per cent.; the number of farmers' sons, daughters, and other relatives (all ages) included in the above table is also 14 per cent. of the total.

In addition to these regular workers, the part-time and casual workers shown in the previous table number 144,000, with aggregate earnings amounting to £4,750,000 or 9 per cent. of the total wages bill. These figures are much more speculative than those relating to regular workers, but they agree with those given by Dr. Carslaw, who says that during the three years 1931–33 payments to casual workers on the farms covered by his survey averaged 10 per cent. of the total labour bill, rising from 9 per cent. in 1931 to 11 per cent. in 1933.

The above total of 715,000 persons with aggregate earnings of £52 millions is probably fairly representative of the years 1931–33. In 1934, 1935 and particularly in 1936, numbers further declined, the total in the latter year being only 640,000, with the result that the total wage bill in 1936, notwithstanding some recovery in wages, must have been under £50 millions. When it is remembered that the average number of workers in the five years 1925–29 was 783,000, the change in the recent period of depression is remarkable. The annual wage bill in those years must have been in the neighbourhood of £57 millions.

This point is of some importance, as it is often claimed that the cost of labour is much higher than formerly. This is, of course, true if the comparison is with weekly wage rates in pre-war days; but the statement is apt to be misleading, unless it is borne in mind that since 1929 there have been heavy reductions in the number of persons employed, and hence in the average wage bill, which according to the above calculations must have been some 12 per cent. less in 1936 than in 1925–29.

From the farmer's point of view, however, the cost of labour includes also the payments for Health Insurance and Employers' Liability. These may amount to 1*s*. a week for adults (less for younger ages and women), and something between £1 and £2 millions should be added to the estimates of the total wage bill on this account. Since May 1936 Unemployment Insurance has also been payable involving an addition of approximately £1 million annually.

Before leaving this question I should perhaps mention here that the only previous estimate of the agricultural wages bill in England and Wales that I have been able to trace is one made by Mr. D. A. E. Harkness in a paper read before the Agricultural Economics Society in 1933, which gives an annual series of figures varying from £54,900,000 in 1925–26 to £52,600,000 in 1930–31. This estimate was made before the issue of the Census, and did not attempt any division of the workers into different categories, the estimate being made by applying an average wage to the number of workers shown in the Agricultural Returns, but, curiously enough, the result for 1930–31 is precisely the same as that reached by the more elaborate method for 1931–32.

It would be of interest if we could compare the number of workers and the wages paid in agriculture with similar figures for other industries, but there seem to be few means of doing so; the Census of Production gives estimates made by the Ministry of Labour of the total wages bill of various industries, but the number of workers was not ascertained on exactly the same basis, so that an average wage arrived at by dividing the total wages bill by the number of operatives employed has some elements of uncertainty, and is only given very approximately by the Board of Trade in the Final Report.

There is, however, one calculation of this kind which may be mentioned. In the Report of the Secretary for Mines, the average cash earnings per person per annum in coal mining in Great Britain are very exactly worked out, and show that in 1932 there were 768,000 persons employed at a total wage cost of £84 millions, or an average of £109 per head. This may possibly be compared with the average for regular workers in agriculture of £84 per head. If the casual workers were taken into account, the average would be much lower, but I am uncertain whether the coal-mining figures include workers comparable to the casual class in agriculture.

No comparison is possible as regards net output per person employed, as there is no recent estimate of net output in agriculture.

A SIMPLE METHOD OF DERIVING DEMAND CURVES.

By E. J. BROSTER.

To many economists, and others to whom the nature of the demand for a commodity or commodities is of interest or value, the assumptions and methods adopted by the mathematical school of statisticians in the derivation of demand curves are often puzzling, sometimes bewildering, and occasionally unconvincing. The principal object of this paper is to suggest a simpler, more straightforward method—less refined mathematically, perhaps, but likely to give more satisfactory results—than those usually applied by the statistician. I hope to show also that when the true demand curve, or rather an arc of the true demand curve, is unobtainable from the observations, the constant elasticity function is superior to the linear function as a guide to its position.

It is proposed to illustrate the arguments by actually applying the simple method to data which have already formed the basis of statistical investigation. And there seems to be none more suited to the purpose than those used by Professor Schultz in deriving the statistical law of demand for sugar in the United States for the 25 years 1890 to 1914.* For he not only derived a demand curve by each of four different methods—two involving the use of link relatives and two the use of trend ratios—but he also assumed linearity of the demand function within the limits of the observations,† and criticized Professor Lehfeldt's assumption that the elasticity of demand for wheat was constant throughout the observed arc.*

---

* *Statistical Laws of Demand and Supply*, 1928.

† "The problem of deriving the law of demand for sugar reduces to the problem of deriving the equation of the 'best-fitting' straight line" (*loc. cit.* p. 36). "It is evident from the scatter diagram (Fig. 11) and from the usual tests for linearity of regression that the regression before us [that is, the demand curve for sugar] is quite linear" (*loc. cit.* pp. 57–58). "When the regression is practically linear, as in the problem at hand, the use of more or less complex equations to represent the law of demand may give impossible results" (*loc. cit.* pp. 83–84). But *vide* also p. 153, *n.*: ". . . the conclusions reached in this study regarding the changes in the elasticity of demand as we go from one point to another on the demand curve, were never based on straight-line demand functions only." Nevertheless Professor Schultz accepted the results of straight-line functions only, in forming all *subsequent* conclusions.

The first question to be answered is: What are we seeking? Professor Schultz derives what he terms the dynamic law of demand from which we are supposed to be able to determine not only the effect on consumption of a given change in price and vice versa, but also the normal trend of consumption and price from year to year. However, the trends which he uses are—in his own words—" satisfactory only within the limits of observation. They may give impossible results if extrapolated beyond these limits " (p. 93). What purpose does a dynamic law of demand serve if we cannot employ it for extrapolation—in estimating the demand next month or next year, for instance, at any given price? Purely dynamic equations are of no practical value unless they can be so employed. On the other hand, the coefficient of the elasticity of demand for any price within a given range has a number of perfectly legitimate practical uses.

Statistical methods of deriving demand curves usually involve the elimination of the secular trend in both price and quantity series. Where the response to price change is quick, or where the secular trend in the price series is slight, there can be no objection to such a procedure, except that it may limit the range of observations to a very narrow one. But where the response is slow and the secular trend in the series steep, only a part of the effect of short-period price movements is reflected in the short-period changes of consumption, with the result that the calculated coefficient of demand elasticity is less than the true coefficient. As we nearly always find it impossible to determine whether the response to price change is quick or slow, and as a wide range of price observations is always preferable to a narrow range, it is better from these points of view to use a method that does not involve the elimination of secular trend in the price series.

II

Measurable disturbing elements are changes in the real value of money affecting the price series, and the trend of population affecting the quantity series. Although there are rather serious objections to adjusting the price series by reference to an index of wholesale prices, it is proposed to use the adjusted data compiled by Professor

---

* *Loc. cit.*, p. 211. See also R. A. Lehfeldt, " Elasticity of Demand for Wheat," *Economic Journal*, Vol. 24, pp. 212 *et seq*. It is not intended that this paper be regarded as an appraisal or criticism of Professor Schultz's well-known work. If there is any criticism at all, it is levelled at the mathematical statistical methods of deriving demand curves in general use, in so far as they sometimes necessitate assumptions that are of questionable validity, and sometimes by their complexity conceal the truth.

Schultz (*loc. cit.* Appendix II, Table IA, p. 214). These are reproduced in Table I below.

The first step is the elimination from the consumption series of that part of its secular trend which is attributable to extraneous factors. As there is no evidence to suggest that during the period under review the rate of change varied appreciably, we may assume for the purposes of a first approximation that if the price had remained constant the quantity series would have been in geometric progression apart from accidental variations about the norm. In order to determine the common ratio of this trend, it is necessary first to plot the two series shown in Table I, one against the other, prices on the ordinate and quantities on the abscissa. It is observed from this that the points for the later years lie to the right of those for earlier years—from which it follows that the common ratio exceeds unity. Now, from the Table it will be seen that the prices for 1891, 1892 and 1911 approximate relatively closely one to the other, but that the consumption in 1892 was probably subnormal. If the consumptions in 1891 and 1911 were normal, the rate of increase between the two years would give the general trend due to extraneous factors. The common ratio, R, is 1·009, from

$$\log R = \frac{\log 79\cdot 2 - \log 66\cdot 3}{20}$$

TABLE I.

The Per Capita *Consumption and the Real Price of Refined Sugar in the United States for each Year* 1890 *to* 1914.

Year.	*Per capita* consumption. lbs.	Real price per lb * cents.	Year.	*Per capita* consumption lbs.	Real price per lb cents.
1890	52·8	6·643	1903	70·9	4·703
1891	66·3	5·061	1904	75·3	4·840
1892	63·8	5·053	1905	70·5	5·331
1893	64·4	5·484	1906	76·1	4·422
1894	66·7	5·209	1907	77·5	4·313
1895	63·4	5·171	1908	81·2	4·803
1896	62·5	5·901	1909	81·8	4·285
1897	64·8	5·863	1910	81·6	4·294
1898	61·5	6·183	1911	79·2	5·009
1899	62·6	5·720	1912	81·3	4·441
1900	65·2	5·727	1913	85·4	3·730
1901	68·7	5·574	1914	84·3	4·166
1902	72·8	4·626			

* "Real price = money price divided by Bureau of Labour Statistics index number of wholesale prices 'all commodities,' average 1900–1909 = 1·00."

By determining the trend from this ratio commencing with unity in the base year, which for our purpose we take as 1890, we have

$$\begin{aligned} &1890 \quad R^0 = 1{\cdot}000 \\ &1891 \quad R^1 = 1{\cdot}009 \\ &1892 \quad R^2 = 1{\cdot}018 \\ &\quad\cdot \qquad \cdot \qquad \cdot \\ &1914 \quad R^{24} = 1{\cdot}230 \end{aligned}$$

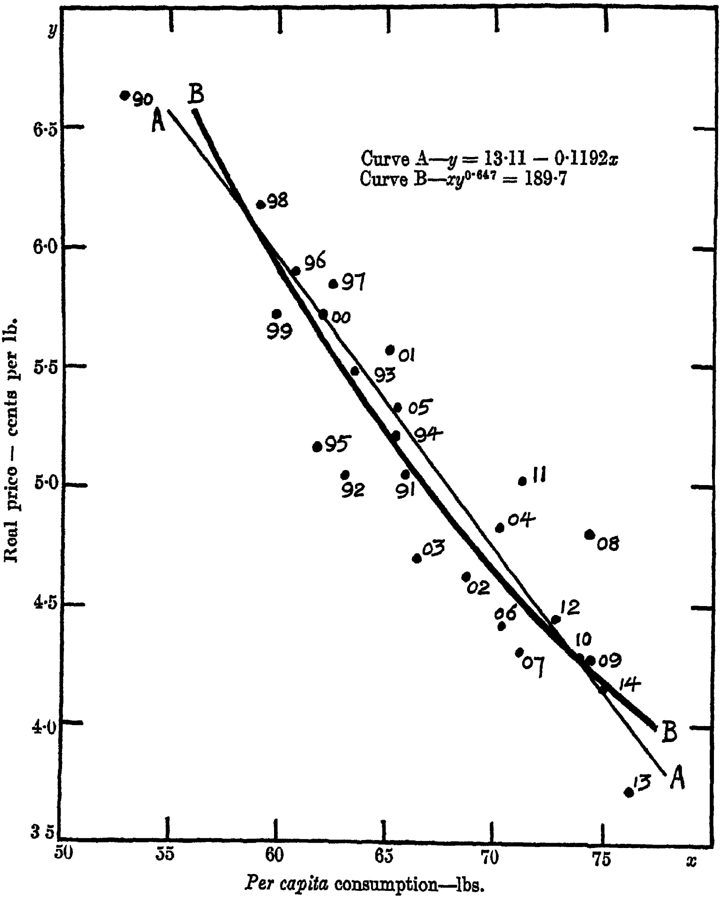


FIG. 1.—Scatter diagram of the real price in each year plotted against the *per capita* consumption corrected for the trend due to extraneous factors, showing the best-fitting line, Curve B.

and by dividing these into the *per capita* consumptions shown in Table I, we have the series with the assumed trend due to extraneous factors removed. We now test the accuracy of the assumed trend by replotting, but the scatter diagram shows that whereas in the first diagram the points for the later years lie to the right of those for earlier years, they now lie almost as far to the left. (The consumption in 1891 was subnormal, or that for 1911 was abnormal.) A second trial based on a common ratio of 1·005 appears to give as perfect an alignment as it is possible to obtain. The resulting series is given in Table II and the scatter diagram in Fig. 1. To show the degree of alignment in the diagram, the year is given by each pair of co-ordinates.*

TABLE II.

The Per Capita *Consumption of Refined Sugar in the United States—The Secular Trend due to Extraneous Factors and the Adjusted* Per Capita *Consumptions.*

(Common ratio, R, = 1·005.)

Year.	Secular trend due to extraneous factors. $R^{(t-1)}$.	*Per capita* consumption trend removed. $\frac{x}{R^{(t-1)}}$ lbs.	Year.	Secular trend due to extraneous factors. $R^{(t-1)}$.	*Per capita* consumption, trend removed. $\frac{x}{R^{(t-1)}}$ lbs.
1890	1·000	52·8	1903	1·065	66·6
1891	1·005	66·0	1904	1·070	70·3
1892	1·010	63·2	1905	1·076	65·5
1893	1·015	63·5	1906	1·081	70·4
1894	1·020	65·4	1907	1·086	71·3
1895	1·025	61·9	1908	1·091	74·4
1896	1·030	60·7	1909	1·097	74·6
1897	1·035	62·6	1910	1·102	74·0
1898	1·040	59·1	1911	1·108	71·5
1899	1·045	59·9	1912	1·114	73·0
1900	1·050	62·1	1913	1·119	76·3
1901	1·055	65·1	1914	1·124	75·0
1902	1·060	68·7			

It is clear that the general course is curvilinear. It is equally clear that a curve cannot be fitted until a greater degree of smoothness is obtained. A process of averaging the observations suggests itself. Apart possibly from a tendency to push the curve slightly to the right, such a course seems perfectly legitimate. There are, however, two difficulties to be considered.

---

* The correlation between the two series is high, r being — 0·93 ± 0·02. According to Professor Schultz, the correlation coefficient for the real price series and the uncorrected *per capita* consumption series is — 0·90 ± 0·03, which is considerably higher than the corresponding coefficient for his series of link relatives or trend ratios, the highest of which is — 0·80 ± 0·05 (see pp. 78 and 80). He explains (p. 78) that the high coefficient of — 0·90 ± 0·03 is the result of "spurious correlation" attributable to such factors as "the growing taste for sugar." Such extraneous factors, however, would cause a great horizontal spread of the co-ordinates, and thereby conduce to lower, not higher, correlation. The higher figure obtained after the correction for extraneous factors of the consumption series is therefore consistent with expectations and inconsistent with Schultz's arguments.

First, the nature of the price data may not permit of averaging. The underlying *money* price in each year does not appear to be the average in the sense that price multiplied by consumption equals the total annual outlay of consumers. The figures are "the average annual wholesale prices at New York of refined sugar" (*loc. cit.* p. 35). But it is not clear whether they are weighted. Probably they are not, although Professor Schultz's methods suggest they are. To what extent the basic money price in each year differs from the average calculated from the total outlay divided by the total consumption cannot be determined, but the error is likely to be small unless the price fluctuations from week to week or month to month were large. We may in any case assume that the weighted average real price in any two or more years is more accurate than the unweighted average.

Secondly, if we use the averages of groups of years in *chronological* order, the arc obtained will be too short to be of value, and the tendency of the averaging process to push the curve to the right of its true position will be strengthened. Again, if we group the observations in ascending or descending order according to the magnitude of the real prices, the implied assumption will be that all deviations are horizontal—that is, that they lie in the consumption series—while if we group them in consumption order, the assumption will be that all deviations are to be found in the price series. The effect of using one or the other of the two series as a basis for grouping is similar to the effect of obtaining the regression of X on Y or Y on X.

Neither assumption is valid.* Normally, the price of a commodity like sugar is, *cet. par.*, a function of the supply, while consumption, or rather the actual demand, is a function of the price. Where the relation between actual demand and price is being considered, the latter is the independent variable, and therefore any deviation or error is horizontal. We know, however, that the prices under review are subject to error, as they are probably not the weighted averages; while in any case we cannot accept the consumption series as either a dependent or an independent variable (*loc. cit.* p. 35). We may overcome these difficulties by proceeding as follows :—

---

* That is, neither is valid so far as we know. The importance of having accurate basic data scarcely needs emphasizing. It is therefore surprising that Schultz devotes so little space to a description of their sources and nature, and especially to the method of obtaining the average price in each year. The exact significance of either series is not at all clear. Apart from the possibility of small changes in the stocks held by consumers, the term *consumption* is a synonym of *demand*. In so far as Schultz derives the law of demand—which is a function of price—from these data, he implies that the figures of consumption are the quantities demanded. In so far as he regards consumption rather than price as the independent variable, he implies that it represents the supply, of which price is a function. However, as it is necessary to confine differences in the results obtained to the differences in method, the accuracy of the data may remain unchallenged. At the same time, we must accept Schultz's dictum to the effect that the series are mutually interdependent.

1. Arrange the two series in ascending order according to real price, multiply one by the other, and thus obtain the real outlay, xy, in each year (trend due to extraneous factors removed).

2. Calculate the five-year moving averages of the x series and the xy series, and divide the latter by the former to obtain the five-year moving averages of the real prices.

3. Rearrange the x series in descending order of magnitude, calculate the five-year moving averages, and place this new series in juxtaposition to the moving averages of the price, y, series, *without changing the order, regardless of whether the years correspond or not.*

This method preserves the curvilinearity—if any—of the functional relationship between the two series without placing the burden of the deviations entirely on one or the other, and tends to remove the residue of the trend of consumption attributable to extraneous factors at only a slight risk of pushing the curve from its true position.* By applying it to the data in Table II, we obtain the two series shown in Table III.

III

A scatter diagram of the two series in Table III is given in Fig. 2. For the purposes of identification and comparison the co-ordinates are numbered 1 to 21, as in the table. Each pair of co-ordinates represents a " mixed bag " for both series, and a glance at the years columns in the table suffices to show that the obvious curvature is not due to an error in the common ratio of 1·005 used for removing the trend in the consumption series. We must necessarily infer that the demand curve for sugar in the United States during the period 1890–1914 was not linear—in spite of Professor Schultz's protestations to the contrary.

But if we cannot accept the assumption of linearity, then what form does the equation to the curve take? Experience in other fields of enquiry indicates that the coefficient of the elasticity of demand for any commodity or service normally varies directly as the price—which is a characteristic of the linear function. On the other hand, general reasoning supports the notion of curvature—of upward concavity, which is a characteristic of the graph of a constant elasticity function. As the arc we require is clearly concave upward,

---

* Where the secular trend in the price series is negligible, this process is sufficient in itself to remove the whole of the extraneous trend in the consumption series. But the resulting demand curve will relate to the mid-year observations only if they relate to consecutive years; and we are left without the means of determining its position in any other year.

Table III.

Five-Year Moving Averages of the Per Capita *Consumption (Trend Removed) and the Real Prices of Refined Sugar in the United States, from* 1890 *to* 1914, *determined from the Two Series arranged in order of Magnitude.*

Key to graph. (Fig. 2).	Real price per pound.		*Per capita* consumption (trend removed).	
	Year.	Cents.	Year.	lbs.
—	1913	—	1913	—
	1914	—	1914	—
1	1909	4·16	1909	74·9
2	1910	4·29	1908	74·2
3	1907	4·35	1910	73·5
4	1906	4·42	1912	72·8
5	1912	4·50	1911	72·0
6	1902	4·60	1907	71·3
7	1903	4·68	1906	70·4
8	1908	4·80	1904	69·5
9	1904	4·88	1902	68·4
10	1911	4·95	1903	67·4
11	1892	5·02	1891	66·4
12	1891	5·10	1905	65·7
13	1895	5·17	1894	65·1
14	1894	5·25	1901	64·5
15	1905	5·35	1893	64·0
16	1893	5·46	1892	63·3
17	1901	5·57	1897	62·7
18	1899	5·68	1900	62·1
19	1900	5·75	1895	61·5
20	1897	5·88	1896	60·7
21	1896	6·04	1899	58·9
—	1898	—	1898	—
—	1890	—	1890	—

we conclude that it lies between its chord and the arc described by the constant elasticity function based on the same two points of intersection. The problem now resolves itself into one of deciding whether the chord or the arc of constant elasticity is the closer approximation to the true demand curve.

Line A (Figs. 1 and 2) is the chord of an arc of the true demand curve drawn so that it intersects the curve at or near the limits of the

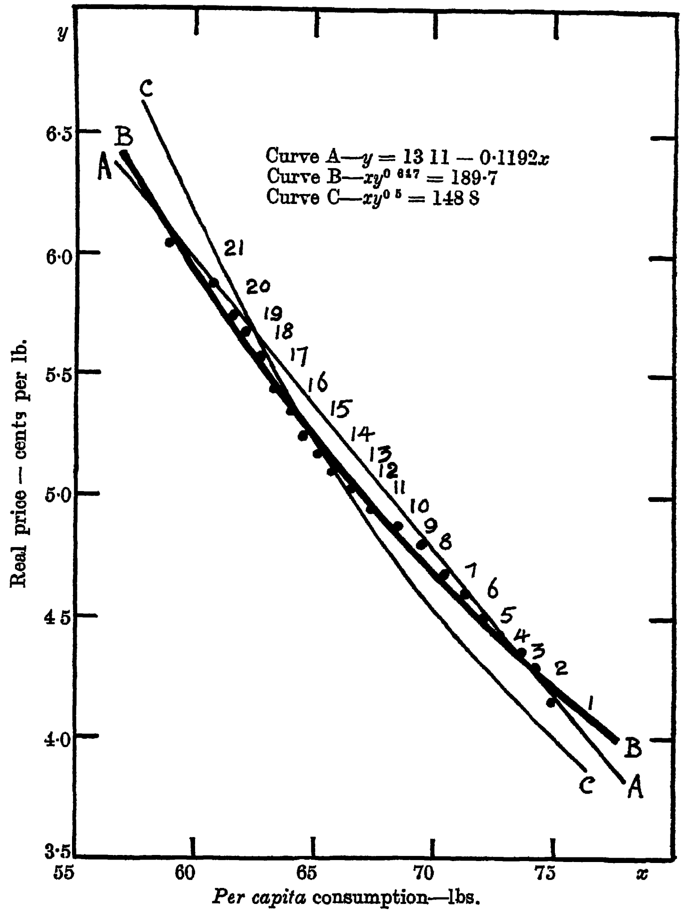


FIG. 2.—Scatter diagram of the five-year averages given in Table III showing the best-fitting line, Curve B, and a representative line having an elasticity coefficient of 0·5, Curve C.

observations. The equation to the curve of constant elasticity takes the form

$$xy^n = k$$

where n is the coefficient of the elasticity of demand of which the mathematical concept is *

$$n = -\frac{y}{x}\frac{dx}{dy}$$

The equation may be stated in linear form

$$\log x = \log k - n \log y$$

---

* See Marshall, *Principles*, Note IV of the Mathematical Appendix.

It follows that the best means of determining the values of n and k is to use the logarithms of the series in Table III. The equation to the best-fitting straight line of these logarithmic series is

$$\log x = 2{\cdot}278 - 0{\cdot}6471 \log y$$

The coefficient of the elasticity of demand is therefore 0·6471, and the value of the logarithm of the constant, k, is 2·278, the equation we require being

$$xy^{0\cdot 647} = 189{\cdot}7$$

Curve B, Figs. 1 and 2 is the graph of this function. It is clear from Fig. 2 that this curve provides as perfect a fit as any other conceivably continuous curve whose $f''(x)$ is positive. It follows that although the coefficient of the elasticity of demand may vary directly as the price, its sensitiveness to price change is so slight that it may be assumed to remain constant for all practical purposes throughout the range of observations.*

The equation to the chord, Curve A, is

$$y = 13{\cdot}11 - 0{\cdot}1192x$$

from which we have

$$n = -\frac{y}{x}\frac{dx}{dy} = \frac{y}{0{\cdot}1192x}$$

From this we obtain the following values of n—one near each end of the observed range of prices and one midway :—

Real price, y. Cents per lb.	Elasticity coefficient, n.
4·350	0·4964
5·125	0·6416
5·900	0·8179

Judged by a linear function, therefore, the coefficient of the elasticity of demand is highly sensitive to price change. The ratio of the highest to the lowest of these prices is 1·36; the ratio of the corresponding elasticity coefficients is 1·65.†

---

* Incidentally, the constant elasticity function provides a form of arc elasticity which has no superior. It conforms to the accepted mathematical concept and its value provides a clue to the point elasticity of demand especially for short arcs. It conforms also to the three essential conditions required of any form of arc elasticity. (See R. G. D. Allen, "The Concept of Arc Elasticity of Demand." *Review of Economic Studies*, Vol. I, pp. 226–7.)

† Where it is safe to suppose that the constant elasticity function applies, the averaging process may be omitted, and the demand curve obtained direct from the best-fitting straight line of the logarithms of the corrected *per capita* consumption and the real price series. For the rest, as the constant elasticity function is a closer approximation to the true equation than the linear function in most if not all cases, there will be less tendency for the arc to be pushed from its true static position for the base year if the averaging process is carried out on the basis of the geometric instead of the arithmetic mean.

IV

As I have already pointed out, if we cannot use a dynamic law of demand for the purpose of estimating future demand at a given price, or for estimating the price that will dispose of a given supply, it is of no practical value. However, extrapolation in some cases may be permissible, so that a dynamic law would be useful. It may easily be derived.

The base year adopted in eliminating the trend of demand attributable to extraneous factors is 1890. The equation to the demand curve constitutes the static law of demand in that year. In eliminating that trend we used a common ratio, R, of 1·005, so that

$$x_t = x_1(1{\cdot}005)^{(t-1)} \quad . \quad . \quad . \quad . \quad . \quad (1)$$

where x_1 is the *per capita* consumption reading on Curve B for a given price, and x_t the *per capita* consumption in the tth year for the same price. For changes in price in the base year we have

$$x_1 y^{0\cdot647} = 189{\cdot}7$$

or

$$x_1 = 189{\cdot}7y^{-0\cdot647} \quad . \quad . \quad . \quad . \quad (2)$$

By substituting this for x_1 in Equation (1) we have a dynamic law of demand, viz.:

$$x_t = 189{\cdot}7y^{-0\cdot647}(1{\cdot}005)^{(t-1)} \quad . \quad . \quad . \quad . \quad (3)$$

for estimating *per capita* demand in the tth year at a given price; or

$$y = \left\{\frac{189{\cdot}7(1{\cdot}005)^{(t-1)}}{x_t}\right\}^{\frac{1}{0\cdot647}} \quad . \quad . \quad . \quad . \quad (4)$$

for estimating the price in the tth year that will dispose of a given *per capita* supply, x_t.

When the eliminated trend of consumption is a geometric progression, and the equation to the arc of the demand curve takes the constant elasticity form, the dynamic law of demand as a literal equation is

$$x_t = ky^{-n}R^{(t-1)} \quad . \quad . \quad . \quad . \quad . \quad . \quad (3a)$$

or

$$y = \left\{\frac{kR^{(t-1)}}{x_t}\right\}^{\frac{1}{n}} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (4a)$$

Normally by far the most important extraneous factor is the trend of net income. It follows that when statistical estimates of the net national income are available—as they are now for the United Kingdom *—a comparison between the common ratio of the trend of consumption and the change from year to year in the total net income may constitute a sound basis for the derivation of an equation expressing the total demand for the commodity or service as a function of the total net income.* By embodying this equation instead of a common ratio of trend in the dynamic law, we are likely to obtain more accurate results.

---

* See Colin Clark, *The National Income and Outlay.* Estimates are given for each year 1924 to 1935 inclusive. Some information for 1936 is given by the same author in the *Economic Journal,* 1937, pp. 308 *et seq.*

In order to demonstrate the use, and presumably to show the accuracy, of his equations, Professor Schultz estimates from them the price in 1914 that would in effect dispose of a supply equal to the consumption in that year. Against the actual money price of 4·683 cents per lb., he obtains by the two first methods the prices of 4·539 cents and 4·533 cents—a difference in each case of 3 per cent. By the two other methods he obtains the real prices of 3·947 cents and 4·123 cents compared with the actual real price of 4·166 cents—a difference in the former of 5 per cent. and in the latter of 1 per cent.† These differences are remarkably small. But if it was indeed his purpose partly to show the degree of accuracy achieved, then it should have been pointed out that the data for 1914 conform more closely to the norm indicated by the best-fit line than those of other years. If we take the other extreme, we find that the data most distant from the norm are those for 1908. For the *per capita* consumption of 81·2 lbs. in that year, the estimated price based on his best method ‡ is 4·232 cents, compared with the actual real price of 4·803 cents—a difference of 13 per cent.

Let us compare these results with those obtainable from Equation (4) above. For x_t substitute the actual *per capita* consumption in 1914 (that is, 84·3) and for t substitute 25—1914 being the twenty-

---

* It is worth noting here that family expenditure on any commodity is a linear function of the total family income. See Allen and Bowley, *Family Expenditure*. In determining and using such an equation, the investigator will be confronted by a number of difficulties, but they are not insurmountable. See, for instance, my article on "Railway Passenger Receipts and Fares Policy," *Economic Journal*, Sept. 1937. In this investigation, for a given real price, y_1, the relation between the real expenditure of consumers and the real national income takes the form $x_0y_1 = aI_0 + \beta$. When the real national income is I_t, we have $x_ty_1 = aI_t + \beta$. Then $x_ty_1 = x_0y_1 + a(I_t = I_0)$, and

$$x_t = x_0 + \frac{a(I_t - I_0)}{y_1} \quad . \quad . \quad . \quad . \quad . \quad . \quad \text{(i)}$$

Since $x_0y^n = k$, $x_0 = ky^{-n}$. Substitute this for x_0 in Equation (i). Then

$$x_t = ky^{-n} + \frac{a(I_t - I_0)}{y_1} \quad . \quad . \quad . \quad . \quad . \quad \text{(ii)}$$

which is the law of demand expressing the quantity demanded as a function both of price and income.

† *Loc. cit.*, pp. 42, 60, 74 and 86.

‡ *Vide* Equation (15), *loc. cit.*, p. 85, the best method being that based on the trend ratios of adjusted data, which give the highest correlation ($r = -0·80 \pm 0·05$).

fifth year counting the base year, 1890, as the first—so that $t - 1 = 24$.

$$\text{Then} \quad \log y = \frac{1}{0{\cdot}647} (\log 189{\cdot}7 + 24 \log 1{\cdot}005 - \log 84{\cdot}3)$$

$$= 0{\cdot}6249$$

$$\therefore y = 4{\cdot}216 \text{ (cents per lb.)}.$$

The difference between this and the actual real price of 4·166 cents in 1914 is 1 per cent., the estimate being as good as the best of Schultz's. For 1908 the estimate based on my Equation (4) is slightly more accurate than that obtainable from Schultz's equation. His estimate is 4·232 cents and mine 4·264, compared with the actual real price of 4·803 cents. In this case also the data for 1908 are the most distant from the norm. (See Fig. 1.)

In order to determine the demand in 1914 at the given real price. substitute 4·166 for y in Equation (3) above.

$$\text{Then} \quad \log x_t = \log 189{\cdot}7 - 0{\cdot}647 \log 4{\cdot}166 + 24 \log 1{\cdot}005$$

$$\text{and} \quad \therefore x_v = 85{\cdot}0 \text{ (lbs. per head of population)}.$$

Between this and the actual consumption of 84·3 lbs. there is a difference of 1 per cent.

These figures show that no matter which method we use, the margin of possible error involved does not fall far short of 15 per cent. They also indicate that even without the elaboration of Equations (3*a*) and (4*a*) now made possible by the publication of comparable statistics of the national income, equations of that type will generally give at least as accurate results as those derived by much more complicated methods. It should be emphasized that the small proportional differences between the estimates and the actual figures in 1914 are in all cases accidental. The data for that year conform very closely to the norm. (See Fig. 1.)

The implied assumption of the foregoing equations is that the elasticity of demand for any given price remained constant throughout the period of observation. There are good reasons for supposing, however, that for any commodity the elasticity of demand varies with the passage of time. So far as I am aware, a satisfactory method of determining the trend has not yet been devised. Even its direction—upward or downward—is uncertain. As distinct from such a special factor as the invention of a substitute, which would tend to cause the elasticity coefficient to rise, the principal normal continuous factor is the trend of *per capita* income. This stimulates a change in each direction through two different channels. First, in the words of Mr. R. G. D. Allen and Professor Bowley, ". . . the price elasticity of demand is only modified by changes in the substitution factor as income changes. It is to be expected, moreover, that substitution becomes more easy for most goods as income rises. The larger expenditure is spread over a wider range of items and the possibilities of substituting other items for a given item are thereby increased. It follows that the elasticity of demand for any item with respect to changes in its price is likely to increase with income. Demands tend to become more elastic as the income level rises." * Secondly, with rising income the marginal utility of money tends to fall, so that for a given real price, the commodity becomes "cheaper" in the eyes of the consumer. A fall in the marginal utility of money stimulates the production of new kinds of commodities and services, the elasticity of demand for which, as a whole, is above unity. As that for all commodities and services remains constant at unity, it follows that as income rises the elasticity of demand for *old* commodities and services tends to fall.

What is the net effect? As I have already stated, no satisfactory answer has yet been given; but as the variation, in whichever direction it may be, is necessarily slight, it is a safe assumption that over a period of even such a length as 25 years, the elasticity of demand remains constant. The coefficient we have derived—that is, 0·647—may be applied equally to 1890 and 1914 as to the average of the period. Special allowance, however, should always be made when a substitute has been rapidly developed during the period of observation.

Professor Schultz's interpretation of his demand curves is interesting. It suggests that the coefficient of the elasticity of demand is a function of deviations from the long-period norm of consumption—that in effect the coefficient remains constant so long as consumption conforms to the norm indicated by the trend, *regardless of the extent to which this trend is influenced by secular price change.*† As this is necessarily an underlying assumption of the methods employed, its subsequent proof begs the question. It is, in any case, invalid. While it is true that the periodic variation in the elasticity of demand for a commodity is partly a function of changes in consumption attributable to non-price factors only, there is, as I have shown, no reason for supposing that it is entirely so. As the trend of sugar prices during the period was downward, Schultz's assumption involves a *rising* demand elasticity for any given price with the passage of time. But the Allen–Bowley " substitution factor " was scarcely applicable to refined sugar, and the other factor, the diminishing utility of money, would have caused a *falling* demand elasticity.

---

* *Family Expenditure*, p. 125.

† *Loc. cit.* pp. 66 and 91. For example, when the consumption trend ratio is 1·0, the coefficient is 0·51, when it is 0·9, the coefficient is 0·67. "When the consumption for any year is 'normal,' that is to say, when it is equal to that indicated by the trend of consumption for the same year . . . then $n = 0{\cdot}5$" (p. 66). I have altered the symbol to conform to my own, and shown the coefficient of elasticity with a positive instead of a negative sign.

The four methods used by Professor Schultz yield remarkably similar results, the average coefficient of the elasticity of demand ranging between 0·46 and 0·52, with an all-round average, as he himself puts it, of 0·5. In order to illustrate the difference between this last figure and that of 0·647, Curve C, with a constant elasticity of 0·5, is shown in Fig. 2. The equation to this curve is

$$xy^{0\cdot5} = 148\cdot8$$

The difference, which is appreciable, requires explanation. In the first place, at least a part of the difference is attributable to Professor Schultz's elimination of the ultimate effects on consumption of price change. In the second place, it is not at all certain whether the average of 0·5 is the coefficient of elasticity at any point on the arc of the true demand curve. The representative point on the best-fit straight line of either the link relatives or the trend ratios is obscured by the wide scatter of the observations.* From Schultz's results, the only safe conclusion we can draw is that the coefficient of demand elasticity lay somewhere between 0·3 and 0·7.†

VI

Compared with mathematical methods, the principal advantage of the simple method outlined above is that the slope and position of any point on the resulting curve are determined by the observations, and not by an arbitrarily selected curve that conforms to, or is a part of, a mathematical scheme. If it fails to reveal the equation to the true demand curve, at least it gives us the next best thing: the coefficient of the elasticity of demand for any price within the limits of the observations. And for the observed arc, it indicates whether the linear function is preferable or not to the constant elasticity function, or to some other function such as Moore's " typical equation to the law of demand." ‡

The fundamental objection to the simple method is the means adopted for ascertaining the trend in the quantity series that is attributable to non-price factors—the need for assuming that it is in geometric progression. It is merely a means of surmounting the principal difficulty of deriving demand curves from time series. But whether we assume the trend to be in geometric or arithmetic progression, the error involved, if any, is to a great extent eliminated in the subsequent process of smoothing.

---

* *Loc. cit.*' Figs. 5, 11. 15 and 22.

† *Loc. cit.* Cf. pp. 66 and 91.

‡ See Schultz, *loc. cit.*, p. 56, and H. L. Moore, " Elasticity of Demand and Flexibility of Prices," *Journal of the American Statistical Association*, March 1922.

In turn, the process of smoothing may call for criticism on the ground that it is crude. Its simplicity is appreciated; the only real objection to it is the danger that lies in the averaging of averages. Apart from the population factor in the consumption series, which is negligible in this respect, the danger has been avoided. Another possible objection is the use of *moving* averages for a purpose not in keeping with the normal statistical object of this device. My purpose here has been to preserve the maximum number of observations, and thus to reduce the risk of producing inaccurate results. Curve fitting is largely a matter of personal judgment—more or less as the degree of alignment to which we reduce the observations is low or high.

One important conclusion we have arrived at is that the coefficient of the elasticity of demand for sugar in the United States during the years 1890–1914 was to all intents and purposes the same for all prices within the limits of the observations. Can we derive from this a law of general application?

Prima facie, the law of the elasticity of demand may be expressed in the following terms: although the coefficient of the elasticity of demand tends to vary directly as the price of the commodity, the variation is slight, so that to all intents and purposes it remains constant during small but finite price movements. It is not clear, however, what constitutes the limit to a small change in price. Refined sugar, the subject of the illustration, has two characteristics that have an important bearing on the problem: it is a necessary of life, and it therefore stands high in the scale of urgency; and it does not possess a substitute of any consequence. These characteristics account for the inelastic nature of the demand for it.

If it were a luxury (in which case it would be in competition with other luxuries), or if there were good substitutes available at similar prices, its coefficient of demand elasticity would be high. Other things being equal, with every decline in its price it would in the former case fall in the scale of esteem and ultimately become first a comfort and later a necessary; and in the latter, its position would approach more and more to one of perfect monopoly. In either case the demand for it would become less elastic, the coefficient falling rapidly at first because the market would still be influenced by competition; but with further price fall, competition would at length disappear, and with it the agency through which movements in its price affect the elasticity of the demand for it.

For this purpose, therefore, the limit of a small change in price must be judged by the elasticity of demand. Where it is high, it is more sensitive to price-change than where it is low. It will be seen in Table III that the highest observed average price was 6·04 cents per lb. and the lowest 4·16 cents per lb. The ratio of the former to the latter is 1·45. For commodities the demand for which has an elasticity coefficient of not more than, say, 0·65, we may therefore state the law of the elasticity of demand in more concrete terms, viz. for practical purposes the coefficient of the elasticity of demand remains constant during any change in price where such change expressed as a ratio of the higher price to the lower does not exceed 1·45. The higher the coefficient, the smaller is the proportional change in price for which we may safely assume constant elasticity.

REPORT OF THE COUNCIL

For the FINANCIAL YEAR *ended December* 31*st*, 1936, *and for the* SESSIONAL YEAR *ending June* 15*th*, 1937, *presented at the* ONE HUNDRED AND THIRD ANNUAL GENERAL MEETING *of the* ROYAL STATISTICAL SOCIETY, *held in the Hall of the Royal Society of Arts, John Street, Adelphi, W.C.*2, *on June* 15*th*, 1937.

THE Council have the honour to submit their One Hundred and Third Annual Report.

The roll of Ordinary Fellows on December 31st last, as compared with the average of the previous ten years, was as follows :—

Particulars.	1936.	Average of the previous Ten Years.
Number of Fellows at end of previous year	1,051	1,053
Number lost by death, withdrawal, or default	64	58
New Fellows elected	62	60
Numbers of Fellows on December 31st	1,049	1,055

Since December 31st last, 29 new Fellows have been elected or restored to the list, and the Society has lost 39 by death, resignation, or default, so that the number on the list, excluding 16 Honorary Fellows, on June 15th, 1937, is now 1,039. The position at the end of each of the last 25 calendar years is shown in the Table on p. 654.

Since June 1936, the Society has lost by death the undermentioned Ordinary Fellows :—

		Date of Election.
	*à Ababrelton, Robert	1904
	Archer, Benjamin	1929
	Carruthers, Sir William	1916
	*Chailley, Joseph	1884
d	Evans, Dr. Samuel	1920
d	Eve, Sir H. Trustram, K.B.E.	1910
c d	Foxwell, Professor H. Somerton, M.A., F.B.A.	1878
c d	Hamer, Sir William Heaton, M.D., F.R.C.P.	1911
	Highton, John E.	1918
	Keating, Matthew	1916
p	*King, Bolton	1883
	Lees-Smith, Major H. S.	1920

* Life Fellow. *c* Served on Council. *d* Donor to the Library.
p Read a Paper or Papers.

		Date of Election.
d	Muirhead, James M. P., J.P., F.S.A.A., F.C.I.S.	1899
	Nevill, C. Henry	1877
d	*Phelps, Rev. Lancelot R., M.A.	1886
	Rawson, Cecil Frank	1924
d	Roussin, Leander Gaspard, C.M.G.	1924
	Snowden, The Rt. Hon. Viscount	1920
	*Spain, Frederick G. L.	1911
d	Sydenstricker, Edgar	1929

Honorary Fellow.

d p	Westergaard, Professor Harold Ludvig (University of Copenhagen)	1907

* Life Fellow. *d* Donor to the Library. *p* Read a Paper or Papers.

The Council especially mourn the loss of their valued colleague, Sir William Hamer, sometime Chief Medical Officer of the London County Council. Sir William served on the Council of the Society from 1914 to 1918 and almost continuously from 1923 to 1934. He was often called upon to take a prominent part at the Society's meetings when medical and kindred topics were under discussion, and his shrewd criticism and kindly wit will be remembered by his hearers.

Professor Foxwell, who died in his eighty-seventh year, had been a member of Council in his earlier days. He joined the Society in 1878, and he and Mr. C. H. Nevill, elected the previous year, were among the Fellows of longest standing. Mr. Bolton King and the Rev. Lancelot Phelps had been Life Fellows for over fifty years. Mr. Bolton King read a paper to the Society on the Statistics of Italy which was printed in the *Journal* for 1903.

The Council have also to deplore the death of Professor Harald Westergaard, the eminent Danish statistician, who was elected to Honorary Fellowship of the Society thirty years ago. He paid his last visit to this country on the occasion of the Centenary of the Society in 1934.

Obituary notices of Sir William Hamer and Professor Foxwell appeared in the *Journal*, Part IV, 1936, and an obituary notice of Professor Westergaard in Part I, 1937.

Since June 1936, the following have been elected Fellows of the Society :—

Almond, John Edmondson.
Barnard, Mildred MacFarlan.
Barton, Cecil Mottram.
Beasley, Professor C. G.
Bedekar, S. K., M.Sc.
Belch, Alexander.
Brown, Henry.
Brunsman, Howard G.

*Büchi, John Henry.
Burcher, Eric Joseph.
Chater, Harold John.
Comrie, Leslie John.
Craft, Herbert Cecil, M.B.E.
Davies, Mostyn.
El-Shanawany, Mohamed Riad.
Epps, G. S. W., C.B., C.B.E., F.I.A.
Farley, George Henry Morris.
Ghatge, Madhavrao Balasaheb.
Gosschalk, Hugh.
Gover, Alfred Terence, B.Com.
Gross, Alexander.
Hall, Norman.
Harman, Harold.
Harris, Alwyn.
Harvey, P. N., F.I.A.
Hays, Samuel, B.Com.
Hodgkinson, Noel Alexander.
Hunt, Bishop Carleton.
Iyer, S. Subramonia.
Jones, Robert Huws.
Joyce, G. James.
*Kay, Harry Bevan, F.I.A.C., F.F.C.S.
Lane, Ben Sidney.
Ledwidge, Joseph Guest, D.Sc.
Martin, Albert Victor.
Mathew, Puthenveetil Chandapilla.
Mills, Robert Arthur.
Owen, Charles Venn.
Pelletier, Achille Joseph.
Philip, The Rev. James Gibson, M.A.
Phillips, W. Eric, B.A., B.Sc.
Poulton, Olive Elizabeth, B.Sc. (Econ.).
el Ramli, Aly Hassan.
Rawicz, Erwin Joseph.
Roper, Eric William.
Ruscoe, John, B.Com.
Rycroft, Arnold, F.L.A.A., F.C.I.S.
Shapiro, Michael.
Stone, Winifred Mary.
Tang, Pei-ching.
Uttley, Kenneth Harrison.
Watson, Terence Cecil.
Wilkie, David Henderson.
Wright, Frederick Ernest Robert.

Representatives of Corporate Bodies:

Brown, J. Robert,	*representing* The London Municipal Society.
Cox, Shawn Maturin,	*representing* Messrs. James A. Jobling and Company, Limited (Wear Glass Works).
Davies, James Lefelys,	*representing* The Milk Marketing Board.
Garratt-Holden, Charles Garratt, B.A., M.Com.,	*representing* The Building Societies Association.
*Rushby, Betty Fairfax,	*representing* Messrs. Alfred Pemberton, Limited.
Shone, Robert Minshull, M.A., M.Eng.,	*representing* The British Iron and Steel Federation.
Wilson, Frank Edmund,	*representing* The Anglo-Saxon Petroleum Company, Limited.

* Re-election.

At the May Meeting, M. Michel Huber, Director of the Statistique Générale de la France, was unanimously elected an Honorary Fellow of the Society.

The statements of receipts and payments during 1936, the balance sheet at December 31st, and the table showing the comparative figures relating to finance and to the numbers of Fellows, are given as usual in Appendices A and B. The accounts for the year 1936 show the expenses incidental to the removal from Adelphi Terrace to Portugal Street, amounting to £1,036. These include the cost of new steel shelving which had to be installed, of the adaptation of some of the old bookcases, and of adjustments and alterations of electric and other fittings and fixtures. As the statement shows, this expenditure was provided for in part by the sum received from the Adelphi Estate in compensation for the disturbance caused to the Society, but mainly by the proceeds of the sale of approximately half of the securities representing the Society's Building Fund (see p. 652).

The finances of the Society have given the Council much concern. In the last seven years there were surpluses of income over expenditure in 1930, 1931, and 1933, aggregating about £934, and deficits in 1932, 1934, 1935, and 1936 totalling £1,037; if the special expenditure for the Centenary is deducted the deficit in 1934 was nearly £332 and in 1932, 1935 and 1936 the deficits were respectively £133, £204 and £274. What may comprehensively be called administrative and office expenses have risen in only a moderate degree and that has been mainly due to justifiable increases in salaries and wages. Expenses of meetings have also varied only within narrow limits. In the course of those seven years two new and important branches of work were started, the Study Group in 1931 and the Industrial and Agricultural Research Section in 1934. The expenses of the former are very small, but those of the latter have been relatively large, on account of the *Supplement*, published twice yearly. It is, however, gratifying to be able to report that, owing to increased sales of the *Supplement*, the charge of the Section on the Society is diminishing and at less than £147 in 1936 was about half of the charge in 1934. There remains the expenditure on the *Journal*, which was £841 in 1930, £903 in 1931, and, for special reasons, £1,053 in 1932; it has since then risen steadily from about £809 in 1933 to £985 in 1936. More space has been given to *Miscellanea*, to *Reviews*, and to *Statistical Notes*, and it is hoped that Fellows have approved the extension of these sections. The length of papers read before the Society has also tended to increase in recent years.

The various increases in expenditure may severally appear to be justified, but the Council hold that the Society ought to see that year by year its expenditure is provided out of income. The most satisfactory way of ensuring this result is to increase the number of Fellows of the Society and of the Members of the Section, and the Fellows and Members already on the roll are urged to do their utmost to introduce a greater number of candidates for election. Meanwhile, in order to bring income nearer to expenditure, the Council have decided to raise the sale price of the *Journal* to the public to 10*s*. per number and that of the *Supplement* to 7*s*. 6*d*. per number, both increases to take effect in 1938. From the nature of the market for these publications it is believed that the enhanced prices will not seriously diminish the number of copies sold and that the net revenue will be greater. In consideration also of the special facilities offered by the Industrial and Agricultural Research Section for the discussion of important technical questions, it has been decided to raise to one guinea the subscription payable by Members who are not Fellows. The Executive also intend, with the assistance of the Editors, to supervise closely the expenditure on the printing of the *Journal.* The length of papers must depend to a considerable extent on their importance and novelty, but, in the interests of economy, authors are being pressed to keep their exposition within the bounds of what is strictly necessary. The Editors' aim is to obtain a proper balance in every section of the *Journal,* so that sufficient space should be given to what is really important and no more.

The Ordinary Meetings have been held in each month of the Session, and the papers read before the Society were as follows :—

1936.	
I.—November 17th ...	Kennet of the Dene, The Rt. Hon. Lord, P.C., G.B.E., D.S.O., D.Sc. Presidential Address : The Consumption of Statistics.
II.—December 15th ...	Rhodes, E. C., D.Sc. The Construction of an Index of Business Activity.
1937.	
III.—January 19th ...	Edge, Major P. Granville, O.B.E. The Demography of British Colonial Possessions : a note on the assembly and interpretation of data.
IV.—February 16th. ...	Flux, Sir Alfred W., C.B., LL.D. Some Scandinavian Statistics : Fragments from a Note Book.
V.—March 16th ...	Meek, Dr. D. B., C.I.E., O.B.E. Some Measures of Economic Activity in India.
VI.—April 20th ...	Discussion on The Value of Royal Commissions in Sociological Research, with Special Reference to the Birth Rate, opened by Professor M. Greenwood, F.R.S.
VII.—May 24th ...	Gibbon, Sir Gwilym, C.B., D.Sc. The Public Social Services.
VIII.—June 15th ...	Leak, H. Some Results of the Import Duties Act.

At the meetings of the Industrial and Agricultural Research Section the following papers were read and discussed :—

1936.	
I.—November 26th ...	Irwin, J. O., Sc.D., D.Sc. Statistical Methods applied to Biological Assays.
1937.	
II.—January 21st ...	Bayes, A. W., M.Sc. Some Considerations of the Variability of Cotton Cloth Strength.

1937.	
III.—April 15th ...	Bartlett, M. S. Some Examples of Statistical Methods of Research in Agriculture and Applied Biology.
IV.—May 27th ...	Rest, E. D. van. Examples of Statistical Methods in Forest Products Research.

During the session 1936–37, the Study Group, under the Chairmanship of Mr. R. F. George, held nine meetings, and the papers read and discussed were as follows :—

1936.	
October 20th ...	George, R. F. A Revised Calculation of the Poverty Line.
November 10th ...	Charles, A. G. Data on the Consumption of Copper in the United Kingdom.
December 7th ...	Poyser, C. A., F.I.A. The New National Life Tables. (Joint Meeting with the Institute of Actuaries Students Society.)
1937.	
January 12th ...	Allen, R. G. D. The Assumption of Linear Regressions.
February 9th ...	Adams, W. F. Applications of Probability in the Study of Road Traffic Problems.
March 9th	Robinson, H. W. Some Statistical Aspects of the Building Industry.
April 13th	Smith, H. Fairfield. Some Problems arising in the Statistical Analysis of Yield.
May 11th	Kendall, M. G. What is Randomness?
June 8th	Neuman, A. M., Ph.D. Unbalanced Budgets and Foreign Exchanges.

His Majesty King George VI on his accession was graciously pleased to notify the Society that he would accord them his Patronage in continuance of that of his predecessor His Majesty King Edward VIII, and that of their Father, His Majesty King George V. A Loyal Address was presented by the Council in February 1937.

The list of Honours conferred by His Majesty on the occasion of his Coronation included the names of three members of the Society's Council. Sir Herbert Samuel, a Past-President, becomes a Viscount; Mr. Vivian, a Knight Bachelor; and Professor Bowley, a Commander in the Order of the British Empire.

The Frances Wood Memorial Prize is again being offered for competition in 1937. The conditions are the same as in 1935, and the latest date for submission of essays is October 31st, 1937.

In the year ended May 31st, 1937, 1,240 works were added to the Library, compared with 1,075 the year before. These figures exclude periodicals regularly received and a number of Parliamentary Papers. During the same period 1,231 volumes were borrowed by 510 Fellows, against 1,304 by 569 Fellows the year before.

The Fellows named below (nominated in accordance with Byelaw 14) are recommended for election as President, Council and Officers of the Society for the Session 1937–38 :—

President.

The Rt. Hon. Lord Kennet of the Dene, P.C., G.B.E., D.S.O., D.S.C.

Council.

*W. A. Basham, O.B.E.
J. Bonar, LL.D., Litt.D., F.B.A.
L. R. Connor, M.Sc.
J. Iris Douglas.
Major P. Granville Edge, O.B.E.
W. Palin Elderton, C.B.E., F.I.A., F.F.A.
Barnard Ellinger, C.B.E.
*G. S. W. Epps, C.B., C.B.E., F.I.A.
Dorothy P. Etlinger.
R. G. Glenday, M.C.
David Heron, D.Sc.
*A. Bradford Hill, D.Sc.
J. O. Irwin, Sc.D., D.Sc.
Leon Isserlis, D.Sc.
Prof. J. H. Jones.
J. Maynard Keynes, C.B.
A. W. Waterlow King.
H. Leak.
*Sir Harry Lindsay, K.C.I.E., C.B.E.
H. W. Macrosty, O.B.E.
Egon S. Pearson, D.Sc.
George Rae, D.Sc.
E. C. Ramsbottom, O.B.E.
*E. C. Rhodes, D.Sc.
E. C. Snow, D.Sc.
J. Calvert Spensley, O.B.E.
Sir Sylvanus Vivian, C.B.
A. D. Webb, C.B.E.
*John Wishart, D.Sc.
F. Yates.

Those marked * were not Members of Council during the preceding Session.

Honorary Treasurer.

A. W. Waterlow King.

Honorary Secretaries.

H. W. Macrosty, O.B.E. E. C. Snow, D.Sc.
Leon Isserlis, D.Sc.

Honorary Foreign Secretary.

E. C. Snow, D.Sc.

The abstract of the Treasurer's account of receipts and payments and the balance sheet as on December 31st, 1936, together with the report of the Auditors on the accounts for the year 1936, are appended.

Signed on behalf of the Council,
KENNET,
President.

H. W. MACROSTY,
E. C. SNOW,
L. ISSERLIS.
Hon. Secretaries.

June 10*th*, 1937.

APPEN

A.—(i) RECEIPTS AND PAYMENTS ACCOUNT FOR

Year 1935. £	*s.*	*d.*	**RECEIPTS.**	£	s.	d.	Year 1936. £	s.	d.
			Annual subscriptions :—						
1,466	*17*	*0*	For current year (703)				1,476	6	0
142	*16*	*0*	Arrears (60)				126	0	0
63	*0*	*0*	In advance (33)				69	6	0
1,672	*13*	*0*					1,671	12	0
436	*2*	*0*	Dividends and interest (including income tax refunded)				436	2	0
797	*5*	*1*	Journal sales (including reprints)				771	1	7
12	*1*	*6*	,, advertisements				14	7	3
66	*15*	*6*	Sale of Supplement				94	17	1
6	*6*	*9*	,, other publications				4	9	8
21	*0*	*0*	Special subscription				10	10	0
4	*10*	*0*	Study Group subscriptions				7	10	0
52	*10*	*0*	Royal Economic Society				50	0	0
—			Miscellaneous					8	1
3,069	*3*	*10*	Total of Ordinary Receipts				3,060	17	8
84	*0*	*0*	Life Compositions				44	2	0
			Special receipts on account of removal :—	£	s.	d.			
—			Compensation for disturbance	317	17	0			
—			Transfer from Building Fund	718	7	11			
							1,036	4	11
3,153	*3*	*10*					4,141	4	7
203	*1*	*7*	Excess of Payments over Receipts				274	19	4
£3,356	*5*	*5*					£4,416	3	11

DICES

THE YEAR ENDED DECEMBER 31ST, 1936.

Year 1935. £	*s.*	*d.*	PAYMENTS.	£	*s.*	*d.*	Year 1936. £	*s.*	*d.*
			Journal (including reprints) :—						
659	*19*	*11*	Printing and paper				742	8	2
97	*0*	*0*	Reviewing				111	10	0
25	*19*	*6*	Reporting				21	12	0
97	*14*	*8*	Distribution				104	3	7
	3	*0*	Repurchase				5	9	0
880	*17*	*1*					985	2	9
136	*13*	*7*	Meetings (including printing and postage)				131	5	9
57	*2*	*4*	Library books				47	8	0
60	*1*	*9*	„ binding				48	15	9
1,071	*7*	*4*	Salaries and wages (ordinary) ...				1,040	1	5
—			Pension				47	12	3
380	*0*	*0*	Rent				380	0	0
2	*7*	*6*	Land tax				1	19	7
14	*7*	*11*	Insurance				13	9	0
79	*16*	*2*	Heating, light and water				90	0	4
26	*2*	*0*	House expenses				44	3	7
26	*10*	*6*	Repairs to premises, etc.				—		
4	*18*	*6*	Furniture and equipment				39	15	1
62	*13*	*9*	Postage, carriage and telephone ...				68	1	10
118	*2*	*6*	Stationery and miscellaneous printing				125	3	0
			Research Section :—	£	*s.*	*d.*			
48	*17*	*10*	Meetings	46	5	6	241	9	1
233	*9*	*11*	Supplement	195	3	7			
4	*3*	*1*	Study Group expenses				12	19	9
10	*8*	*8*	Miscellaneous				14	12	4
40	*5*	*0*	Guy Medals				3	17	6
3,258	*5*	*5*	Total of Ordinary Expenditure ...				3,335	17	0
84	*0*	*0*	Amount carried to Life Composition Fund (see Balance Sheet)				44	2	0
10	*10*	*0*	Subscription to Int. Scientific Congress				—		
3	*10*	*0*	Loyal Address				—		
			Expenses of removal to Portugal Street :—	£	*s.*	*d.*			
—			Moving	135	13	4			
—			Shelving	722	8	4			
—			Legal expenses ...	30	1	0			
—			Minor alterations ...	81	10	0			
—			Extra assistance, overtime and bonuses ...	66	12	3			
							1,036	4	11
£3,356	*5*	*5*					£4,416	3	11

APPEN

A. (ii) BALANCE SHEET

LIABILITIES.

Year 1935. £	*s.*	*d.*		Year 1936. £	*s.*	*d.*
63	*0*	*0*	Advance annual subscriptions ...	71	8	0
99	*7*	*0*	Advance Journal and Supplement subscriptions	99	18	4
—			Bank advance	53	0	2
138	*6*	*0*	Sundry creditors	303	11	11
300	*13*	*0*		527	18	5
1,921	*10*	*0*	Life composition fund....	1,965	12	0
7,432	*0*	*2*	Balance in favour of the Society (exclusive of (1) Books in Library, (2) Journals and other publications in stock, and (3) Pictures, Furniture and Fixtures)	7,105	18	10
£9,654	*3*	*2*		£9,599	9	3

BUILDING FUND (ESTABLISHED JULY 10TH, 1873).

On December 31st, 1935, the Fund consisted of £763 4*s*. 9*d*. 3½ per cent. Conversion Loan and £700 14*s*. 1*d*. 4 per cent. Consols. In connection with the removal to the new premises the 4 per cent. Consols were sold in March 1936; the February dividend (£14 0*s*. 3*d*.) had been invested in the purchase of £12 2*s*. 4*d*. of the stock, making the total holding £712 16*s*. 5*d*. This was sold at £114 and produced £810 9*s*. 8*d*., of which £718 7*s*. 11*d*. was spent, leaving a balance of £92 1*s*. 9*d*. available for re-investment. The dividends received during 1936 on the 3½ per cent. Conversion Loan (£26 18*s*. 6*d*.) were invested in £24 19*s*. 5*d*. of the same stock, and the Fund now consists of £788 4*s*. 2*d*. 3½ per cent. Conversion Loan and a cash balance of £92 1*s*. 9*d*. to be re-invested.

FRANCES WOOD MEMORIAL FUND (ESTABLISHED MAY 13TH, 1920).

On December 31st, 1935, the Fund consisted of £500 4 per cent. Preference Stock, London, Midland and Scottish Railway, and £139 4*s*. 10*d*. cash at bank. During 1936 dividends of £15 7*s*. 6*d*. were received, and the Fund was credited with £4 10*s*. income tax refunded and debited with £30 for a prize. In November £91 18*s*. was expended in the purchase of £100 of the same stock. Thus at 31st December, 1936, the Fund consisted of £600 4% Preference Stock, London, Midland and Scottish Railway (value at 31st December, 1936, £549) and £37 4*s*. 4*d*. cash at bank. In December this sum was deposited in the Post Office Savings Bank.

DICES

AT DECEMBER 31st, 1936.

Year 1935. £	*s.*	*d.*	ASSETS.	Year 1936. £	*s.*	*d.*
			Investments, at cost or under :—			
1,185	*0*	*0*	£2,236 11*s.* 3*d.* 2½% Consols (General Fund)	1,185	0	0
5,580	*0*	*0*	£10,527 12*s.* 3*d.* 3½% Consols (Guy Bequest)	5,580	0	0
1,299	*0*	*0*	£1,841 3½% Conversion Loan ...	1,299	0	0
490	*0*	*0*	£500 3½% War Loan	490	0	0
800	*0*	*0*	£1,169 17*s.* 6*d.* 3% Local Loans Stock	800	0	0
100	*0*	*0*	£666 4% 2nd Pref. Stock, L. & N.E. Rly.	100	0	0
25	*0*	*0*	£266 5% Prefd. Ord. Stock, L. & N.E. Rly.	25	0	0
9,479	*0*	*0*	(Market value, 31 Dec., 1936, £14,645)	9,479	0	0
			Cash : £ *s.* *d.*			
			On deposit ... ... —			
			On current account ... —			
91	*3*	*2*	In hand 5 7 9	5	7	9
84	*0*	*0*	Arrears of annual subscriptions recoverable (say 40)	84	0	0
—			Sundry debtors	31	1	6
£9,654	*3*	*2*		£9,599	9	3

REPORT OF THE AUDITORS.

"We have examined the foregoing Receipts and Payments Account, Balance Sheet, and Statements in regard to the Building Fund and the Frances Wood Memorial Fund with the Books and Vouchers of the Society and find them to be in accordance therewith. We report that the Balance Sheet is, in our opinion, properly drawn up so as to exhibit a true and correct view of the state of the Society's affairs, as shown by the Books. We have verified the Investments and Cash balances."

(Signed) BARNARD ELLINGER.
R. F. GEORGE.
ARTHUR M. SOUTHALL.

March 2nd, 1937.

APPEN

B.—STATEMENT OF THE CONDITION OF THE SOCIETY

Year.	Constitution.				Fin					
	Number of Fellows at end of Year.		Changes during the Year.		Receipts.					
	Totals.	Life Fellows included therein.	Gains by Election, &c.	Losses by Death, &c.	Annual Subscriptions.	Compositions[1]	Dividends, Interest, &c.[2]	Journal Sales.[3]	Other Items.	Totals.
					£	£	£	£	£	£
1912	854	175	44	57	1,336	105	341	334	41	2,157
1913	846	174	53	61	1,331	84	341	294	58	2,108
1914	821	169	39	64	1,281	42	339	271	51	1,984
1915	772	163	12	61	1,243	63	319	268	32	1,925
1916	758	163	34	48	1,181	42	284	325	18	1,850
1917	757	161	40	41	1,186	53	276	311	130	1,956
1918	761	167	47	43	1,132	222	456	305	3	2,119
1919	796	172	91	56	1,297	273	276	603	10	2,459
1920	882	180	123	37	1,373	251	291	730	95	2,740
1921	946	186	112	48	1,481	231	603	662	39	3,015
1922	969	187	71	48	1,499	126	454	689	142	2,910
1923	996	195	66	39	1,476	242	506	739	114	3,075
1924	1,002	194	68	62	1,638	105	400	666	81	2,890
1925	1,030	195	79	51	1,611	189	399	807	43	3,049
1926	1,054	197	77	53	1,619	116	404	780	112	3,031
1927	1,074	199	62	42	1,665	84	376	792	84	3,001
1928	1,079	201	56	51	1,680	84	397	748	87	2,996
1929	1,076	202	61	64	1,804	137	400	866	124	3,331
1930	1,058	204	50	68	1,663	126	451	1,026	680[4]	3,946
1931	1,064	208	62	56	1,667	115	452	948	80	3,262
1932	1,031	210	46	79	1,621	126	460	824	54	3,085
1933	1,024	205	56	63	1,586	21	435	723	122	2,887
1934	1,037	207	62	49	1,625	136	442	756	98	3,026
1935	1,051	205	67	53	1,673	84	436	864	163	3,153
1936	1,049	200	62	64	1,672	44	436	866	1,129[5]	4,147

---

[1] Life Compositions have been carried to a special Fund from 1921 onwards, and are ncluded among the payments in "other items" column.

[2] Exclusive of the Building and Frances Wood Memorial Funds.

[3] Includes sales of Supplement from 1934 onwards.

[4] Includes £600 from sale of *Times* in 1930.

[5] Includes £1,036 special receipts on account of removal.

DICES

DURING THE LAST TWENTY-FIVE YEARS, 1912-1936.

ance.								
Payments.							Market Values of Investments at end of Year.	Year.
Journal.[9]	Meetings.[7]	Library (Books and Binding)	Salaries and Wages.	Rent.	Other Items.	Totals.		
£	£	£	£	£	£	£	£	
725	85	81	620	380	283	2,174	10,599	1912
658	76	79	632	380	233	2,058	10,092	1913
793	82	88	615	380	361	2,319	9,528	1914
458	64	40	480	380	222	1,644	8,182	1915
516	50	36	492	380	181	1,655	7,702	1916
413	71	54	516	380	199	1,633	7,656	1917
651	91	33	534	380	211	1,900	8,282	1918
774	86	50	645	380	349	2,284	7,672	1919
913	89	99	904	380	454	2,839	6,848	1920
900	110	94	954	380	390	2,828	7,605	1921
983	98	103	1,006	380	755[6]	3,325	8,605	1922
922	146	107	1,010	380	445	2,940	8,666	1923
947	127	138	1,022	380	357	2,971	8,962	1924
940	132	116	1,021	380	373	2,962	8,423	1925
1,144	131	98	991	380	366	3,110	8,122	1926
1,213	150	119	899	380	302	3,063	8,375	1927
835	136	104	793	380	517	2,765	8,343	1928
839	150	156	878	380	238	2,741	8,462	1929
841	151	120	864	380	408	2,764	9,636	1930
903	147	206	921	380	376	2,933	9,151	1931
1,053	161	235	1,005	380	384	3,218	12,908	1932
809	149	96	1,001	380	330	2,765	13,167	1933
1,061	194	103	1,001	380	712[8]	3,451	15,839	1934
1,114	185	117	1,071	380	489	3,356	14,897	1935
1,180	178	96	1,040	380	1,542[10]	4,416	14,645	1936

---

[6] Includes £395 for Catalogue printing in 1922.

[7] Includes meetings of the Research Section from 1934 onwards.

[8] Includes special expenditure on Library and grant to Centenary Fund.

[9] Includes Supplement from 1934 onwards.

[10] Includes £1,036 expenses of removal and equipment of new premises.

PROCEEDINGS OF THE ONE HUNDRED AND THIRD ANNUAL GENERAL MEETING OF THE ROYAL STATISTICAL SOCIETY, HELD IN THE HALL OF THE ROYAL SOCIETY OF ARTS ON TUESDAY, JUNE 15, 1937.

The Chair was taken by the President, the Right Honourable LORD KENNET OF THE DENE, P.C., G.B.E., D.S.O., D.S.C., at 5.0 p.m.

The HONORARY SECRETARY read the notice convening the meeting.

The CHAIRMAN presented the Annual Report of the Council for the financial year 1936 and the Session 1936–37. According to custom, this was taken as read. The CHAIRMAN moved that the Report be adopted and printed in the *Journal*, and on being seconded the motion was carried unanimously.

The HONORARY SECRETARY announced that in accordance with Bye-Law No. 9 the Council had ordered the names of eleven Fellows to be struck off the roll as those of defaulters. The list of names was laid on the table.

The ballot for the election of the President, Council, and Officers for the Session 1937–38 was then taken, Mr. Dudley Walton and Mr. Stewart Jones being appointed scrutineers. As a result the Chairman announced that all those named on the list put forward for the ballot had been unanimously elected for the several offices.

Dr. C. O. George proposed a very sincere and cordial vote of thanks to the President and Council for their work on behalf of the Society during the session which had just ended, which was greatly appreciated by all the Fellows. Dr. Rhodes seconded the motion, which was then put to the meeting and carried unanimously.

The meeting then adjourned for the Ordinary Meeting.

REVIEWS OF STATISTICAL AND ECONOMIC BOOKS.

CONTENTS.

PAGE

1.—*Hill* (*A. Bradford*). Principles of Medical Statistics ... 657

2.—*Hays* (*Samuel*). An Outline of Statistics 658

3.—*Carr-Saunders* (*A. M.*). World Population 659

4.—*Goodrich* (*C.*) *and others*. Migration and Economic Opportunity 660

5.—*Fritz* (*W. G.*), and *Veenstra* (*T. A.*). Regional Shifts in the Bituminous Coal Industry 663

6.—*Clark* (*Colin*). National Income and Outlay 665

7.—*Daniels* (*G. W.*) and *Campion* (*H.*). Distribution of National Capital 668

8.—*Robinson* (*Joan*). Essays in the Theory of Employment... 669

PAGE

9.—*Haberler* (*Gottfried von*). Prosperity and Depression ... 671

10.—*Neisser* (*Hans*). Some International Aspects of the Business Cycle 673

11.—Trial Census of Distribution in Six Towns 674

12.—*Robbins* (*Lionel*). Economic Planning and International Order 675

Rather (*A. W.*). Planning under Capitalism ... 675

Burrows (*Raymond*). Problems and Practice of Economic Planning 675

13.—*Johnson* (*E. A. J.*). Predecessors of Adam Smith ... 678

14.—Other New Publications ... 680

1.—*Principles of Medical Statistics.* By A. Bradford Hill, D.Sc., Ph.D. London: The Lancet, 1937. 8⅝″ × 5⅛″. vii + 171 pp. 6*s*.

A very distinguished teacher of medicine, with more than fifty years' experience of medical research and teaching, gave a lecture earlier this year to the students of the medical school of which he is without any doubt the most distinguished ornament, under the title "The fallacies of statistics in medicine." The lecture was given in all sincerity to warn young medical students of the dangers of meddling with statistics. The account given by one of his hearers was sufficient to prove that, like M. Jourdain, who had spoken excellent French prose for thirty years without knowing it, Professor Almroth Wright was a sound medical statistician! Some statisticians may, like poets, be born, not made, but the majority of medical men need to learn the technique of statistical method just as the surgeon needs to learn anatomy, and medical men are indeed fortunate to have at their disposal the small handbook provided for their use by Dr. Hill. In seventeen chapters and less than two hundred pages the essentials of statistical method are presented in simple language, with the minimum of mathematical symbolism and requiring no more of mathematics than the four rules of arithmetic and the ability to extract a square root. The subjects dealt with are selection, the presentation of statistics, variability, problems of sampling as illustrated by averages, proportion, and differences, the use of χ^2, the correlation coefficient, and life tables, with three valuable chapters on common fallacies and difficulties. The numerical illustrations are all drawn from the medical man's daily work. Naturally, the mathematical theory underlying some of the methods and tests cannot be given, but Dr. Hill very ingeniously and adequately for his purpose uses a convincing inductive method. In dealing with proportions derived from samples, for instance, he considers in detail samples of one, two, three, four, ten and one hundred, and so gives confidence to the non-mathematical reader in the general result that under the conditions stated the standard error of the proportion p is $\sqrt{pq/n}$. Great stress was laid by Fréchet and others at the London meeting of the International Statistical Institute on the fallacious use made of correlation coefficients by statistical amateurs. The warnings in this little book—that the relationship must be represented by a straight line, that the regression straight line must not be unduly extended and that association is not necessarily correlation—are sufficiently explicit. A chapter on the correlation ratio might perhaps be added to this section without unduly adding to the size of the book. The best chapters are the three on common fallacies and difficulties. They deal with the mixing of non-comparable records, neglect of the period of exposure to risk, absence of exposed to risk or standard of comparison, time relationships that may be fallaciously assumed to imply cause and effect, and the danger of using proportional rates. Of the many numerical illustrations given Table XV may be cited:

Year.	Number of Persons.		Number of Persons attacked.		Attack Rate per cent.	
	Inoculated.	Uninoculated.	Inoculated.	Uninoculated.	Inoculated.	Uninoculated.
1935...	100	1,000	10	100	10	10
1936...	500	600	5	6	1	1
1935 and 1936 ...	600	1,600	15	106	2·5	6·6

There may be medical men with an inborn statistical sense who would instinctively avoid the pitfall of the third line. For others a book such as this is essential and it won't do the first category any harm to read it.

L. I.

2.—*An Outline of Statistics.* By Samuel Hays, B.Com. (Hons.). London: Longmans Green, 1937. 8″ × 5½″. vii + 215 pp. 6*s*.

This book is designed primarily to meet the needs of commercial students and of those persons interested in professional examinations.

A brief account of the meaning and uses of statistics is followed by an outline of the principles involved in the collection of data. The presentation of statistical material is discussed and leads to an elementary consideration of the frequency table, while the elements of graphical representation are particularly well explained. As a normal development of graphical methods, the recognition of correlation by plotting the two series is given special mention. Interpolation and logarithmic scales are also discussed. Emphasis is laid on the economy of time to be effected by adopting short-cut methods in arithmetic, a commendable feature not always encountered in books of this type. The process of determining simple averages and the standard deviation by working from an arbitrary origin is clearly shown. The analysis of time series and correlation are carefully discussed, but although the nature of the regression line is explained, no indication of its determination is given.

The statistical technique as described by the author is related to various well-known published statistics in four specific chapters, so that a practical aspect is given to statistics of demography, employment, overseas trade and prices. The last two chapters are devoted to the application of statistical methods to business problems. A short note on sampling and a wide range of statistical exercises are given in appendices.

Of the several books on elementary statistical methods that have been published recently, this is one of the best. R. F. G.

3.—*World Population; Past Growth and Present Trends.* By A. M. Carr-Saunders. Oxford: Clarendon Press, 1936. 8½" × 5¼". 336 pp. *12s. 6d.*

The future of our population is a subject which at present needs no publicity agent, and the predicted decline in our numbers is not likely to be positively correlated with the amount of attention devoted to it. Publications come and, one might add in many cases, go. Some deal with deliberately limited aspects of the subject, such as the excellent little book on *The Struggle for Population* by Mr. Glass; others aim at describing in simple terms the present position in our own country, such as the equally good pamphlet by the same author and Dr. Blacker. But for Professor Carr-Saunders all the world's a stage, and his broad survey of its many population problems is so far from being ephemeral that to give a short account of it more than a year after its publication needs no excuse.

The object of his work, published under the auspices of the Royal Institute of International Affairs, has been to trace the causes and consequences of the immense expansion of numbers which has taken place in the last two centuries, and to indicate the problems which arise from the position as it is now. To measure at all accurately the actual expansion that took place either in the world as a whole or, still more, in different parts of it, is not a feasible task. For many countries the data are not trustworthy even now. In his opening chapters Professor Carr-Saunders gives a careful review of the available information on total numbers, on the probable course of birth and death rates, and the influences of migration on a large scale. He then passes to the causes of the declining death rate which made such expansion possible. In Western Europe it is fairly clear that the causes lay largely in what may be termed social, sanitary and medical changes. In Southern and Eastern Europe these factors are hardly likely to have been of great importance, and he finds the most probable explanation in the improvement of political conditions relating to the maintenance of external and internal order. To the same factor may be attributed the growth of oriental populations, especially following upon their contact with Europe. The much more recent fall in fertility, which has now brought the replacement rate below unity in most countries of Western civilization, Professor Carr-Saunders attributes mainly, if not entirely, to birth-control. But birth-control is only a means to an end, and much of the interest lies in the questions why people have deliberately set a limit to the size of their families, to what extent the habit may progress and how the trend may be reversed. If amidst a gamut of reasons we may single out as fundamental the woman's desire to be delivered of the burden of a large family—a burden not necessarily in the main economic—then we can be certain that that burden has not been yet fully relieved. There is still no dearth of unwanted children who would not be born if a foolproof and inexpensive method of contraception became available. If the inconveniences attaching to parenthood are to be removed and a "fearful generation, longing for security" is to be persuaded to reproduce itself, then, in Professor Carr-Saunders's opinion, nothing less than a social revolution, a transformation of the whole scheme of life, is necessary. His chapters on the small family "habit" and the rather feeble attempts that have been made in European countries to counteract it are particularly interesting.

Turning to the East, he finds a strong indication of over-population in Japan, and that the further increase in its numbers which is to be anticipated is a formidable menace. Indian vital statistics suggest to him pressure upon the means of subsistence, and expansion of those means seems limited. The prospect there is a slow and fluctuating population. China is at or near the Malthusian limit. We have already what will soon be accentuated, a contrast between Europe and its oversea derivatives engaged in a struggle for population and these Eastern countries entangled in the difficulties of excessive numbers. This inevitably brings up the question of the under-developed countries under European control, and Professor Carr-Saunders devotes several chapters to various aspects of migration and these possible outlets for surplus population, and to the restrictions that are at present placed upon movement. In total he has written a book which, if the cliché may be allowed, is certainly thought-provoking, even if no very cheerful thoughts can be amongst those that are aroused. A. B. H.

4.—*Migration and Economic Opportunity.* By Carter Goodrich and others. Oxford University Press, 1936. 10" × 6$\frac{3}{4}$". xvii + 763 pp. *22s. 6d.*

It would be difficult to find a better American illustration of the value of team work in economic and social research than this volume provides. It is "the report of the Study of Population Redistribution which was organized in 1934," and "the project was initiated by the Social Science Research Council." In an admirable introduction the authors describe the "general bewilderment" which gave birth to the investigation and determined the nature of the major analysis. If men and women are out of work, can they hope to gain employment by immigration? If their living is precarious, would they be more secure in other locations? The central theme is the relationship between migration and economic opportunity, though the " last term should not be used in a purely individualistic sense." Natural resources may be wasted for the sake of monetary gain; isolated communities may not pay sufficient taxes to provide school and road maintenance. " These questions of the cost of social services and of the conservation of natural resources fall no less clearly within the scope of the investigation than do those of individual incomes." In Great Britain we have become familiar, since the war, with the fact that there are three kinds of migration. A new industrial area may spring into being and draw its inhabitants from many parts of the country, though largely if not mainly—witness Oxford—from the surrounding districts. The new economic opportunity attracts the " nomadic " elements of the population. This type of migration is typical of a rapidly developing community and until recently was characteristic of the United States of America. California attracted migrants even from the Atlantic seaboard, and more recently the magnetic influence of Florida reached to the extreme north. The second kind of migration is that which is enforced by the relative decline of economic opportunity. The population may increase so rapidly as to press upon the means of subsistence in almost the Malthusian fashion; or established industries may be permanently injured and cause an absolute decline of economic opportunity. Such enforced migration is not confined to the nomadic elements, but includes those whose roots are deep in the local soil; and economic opportunities are widely scattered, and difficult to find. The first kind of migration is a process of industrial and social integration, the second a process of social disintegration. The second now confronts the United States of America, and it is with this that the report is mainly concerned. The two kinds of migration may proceed almost simultaneously, being generated by the same force. The recent growth of the textile industry in North Carolina has been mainly at the expense of the New England industry—it represents a transfer rather than a real growth. The workers employed in the new industry have been drawn from the South, where labour is plentiful and cheap and the standard of living relatively low. The displaced New England workers migrate to places within the same region in search of alternative employment and of the standard of living to which they have been accustomed.

The third kind of migration is that caused by the " diffusion " of industry, that is to say, the movement of industry from the central parts of large cities to their expanding peripheries. Suburbanization in industry may not produce corresponding movements among the workers, who may utilize travel facilities and prefer not to change their residence, so that the new suburbs create a new distribution of population. But the removal of industries to more remote places and the growth of satellite towns necessitates migration of the workers affected by the change. The first type of migration receives but little attention in the report: it does not constitute a problem; its cause is growth, not decay. The second is examined at great length. The authors point out the contrasts in the economic levels of different regions and investigate four samples—the Southern Appalachian coal plateaus; the old cotton belt; the Cutover region of the Great Lake States, and, finally, the great plains. They were selected as samples of regions suffering from persistent unemployment and, consequently, a relatively low standard of living. "Economic opportunity" has not been sufficient to absorb the efforts of the available population. Natural changes (such as soil erosion), the decline of industry (such as cotton growing), too rapid increase of industry (such as coal-mining), or too rapid growth of population (in the South) produced, either separately or jointly, a state of "overpopulation." Migration of the second kind is essential if the difficulties of these regions are to be removed. Where is the surplus to find "economic opportunity"?

The authors then proceed to investigate recent trends in the distribution and growth of industries. They supply an amazing wealth of detail in discussing the main subjects included in such an investigation—the forces determining the degree of geographic concentration or of dispersion or "scatter"; the diffusion of industry; the concentration of production in fewer units; the relative rates of growth of different industries; the relation of technological and other changes to displacement and reabsorption. It would be impossible to do justice to the authors in a summary of their statements, while a selection of quotations could not fail to be misleading. But it may be said that their conclusions are by no means optimistic. They point out that the broad tendency has been towards concentration in a few well-defined areas, within which large cities reveal a strong tendency towards diffusion and smaller cities tend to grow within easy reach of central cities. Further, those industries, such as agriculture and mining, which are still widely dispersed (yet reveal a tendency towards concentration) offer but little prospect of sufficient and sufficiently rapid growth to absorb the surplus. Those which offer such a prospect tend to be concentrated in well-defined industrial regions. "Economic opportunity" is also examined in another way. Industries are classified from the point of view not of location but of rate of growth and power of absorption. Primary industries offer no prospect. Such industries as iron and steel production and others of the semi-manufactured group may grow, but not quickly enough to do more than reabsorb those displaced by technological changes. Fabricating industries provide a greater measure of opportunity, but the most hopeful, from this point of view, are the other "centre" industries and services, such as road construction, education, etc. And these are mainly "public" industries.

The volume consists of two parts, the first of which has been the subject of the above comments. In the second part, to which only brief reference can be made, the authors are concerned with the control of migration. They trace the record of "unguided migration," examine the experience of Russia, Germany and Great Britain, and discuss the measures employed in recent years in the United States. The concluding chapter (followed by an invaluable appendix of nearly a hundred pages) contains a discussion of future policy which is worthy of close study by those who are mainly interested in the problems of our own country. And he who reads the concluding chapter will feel compelled to turn back and read others. Alfred Weber is nowhere mentioned in the volume, but the influence of his works is evident: which is to say that the approach to the problem and its subsequent treatment would satisfy the most exacting scientist. Some day Weber's works may find a market in Great Britain.

J. H. J.

5.—*Regional Shifts in the Bituminous Coal Industry, with special Reference to Pennsylvania.* By Wilbert G. Fritz and Theodore A. Veenstra. Pittsburgh Bureau of Business Research, University of Pittsburgh, 1935. $9\frac{1}{2}'' \times 6\frac{1}{4}''$. xvii + 197 pp. $2.

The bituminous coal industry of the United States of America, which is more than twice as large as that of Great Britain, has been suffering, for many years, from the same disease as the latter. The industry continued to grow long after the demand for its products had begun to dwindle. On both sides of the Atlantic cyclical changes in production and prices served to obscure, for some years, the central problem of the industry, but the truth was revealed, at approximately the same time, by the Samuel Commission and an American Commission. In 1928 voluntary organizations in this country were contemplating various forms of price and output control; in the United States similar schemes were under discussion. In 1930 a Coal Mines Act was passed in Great Britain to deal with the central problem, but, contrary to the expectations of its promoters, the organizations that were set up under its terms were called upon to deal with the more urgent problems presented by a cyclical depression. In the United States the "Code" set up in 1933 under the N.R.A. was primarily designed to deal with the cyclical depression and its problems, but the Code Commission was immediately confronted with the central problem. Apart from the fact that the N.R.A. was declared unconstitutional it became clear that the Code was inadequate, and its place was taken by the "Guffey" Act. Last year the Supreme Court upheld the Carter appeal and the new Act was also declared unconstitutional. Thus the American industry again threatened to return to "the jungle" and the earlier voluntary schemes were overhauled. But legislative attempts to reorganize the industry have not been entirely fruitless. The "operators" (*i.e.* owners) not only fear the jungle but have become better acquainted with each other. Even if federal legislation remains impossible, voluntary co-operation has been facilitated—though it remains to be seen whether it can be made really effective within the framework of the anti-trust laws. Further, the repetition of the old and relentless process of wage-cutting has been made more difficult by the recent wage agreement covering the Appalachian region and affecting nearly three-quarters of the total output of the country. A comparative study of the American and British industries is even more fruitful than a comparative study of the German and British industries.

The causes of the continuous fall in the total demand for coal are well known. One is the rapid increase in boiler efficiency, which has affected the demand not only for industrial coal but also for railroad coal. The other main cause is the growth in the competition of substitutes, including oil and electricity. In the United States the most important of the substitutes is natural gas. While the demand was steadily declining, the producing capacity of the industry was rapidly increasing. Near the end of the nineteenth century several railway lines were built in the Southern Appalachian region and made possible the exploitation of the local coal resources, particularly those of West Virginia and Kentucky. The southern region contains a large variety of coals of good quality, and the different classes that are available made it possible to supply suitable "mixtures" for most markets. The coal is easily mined, human costs are relatively low, while the wages paid to miners during this period were much lower than in the north.

The growth of the southern industry meant that the incidence of the decline in total demand was borne by the northern industry. The depression in the industry as a whole was accompanied by important changes in the relative importance of the older regions. Nor should it be forgotten that the development of road transport resulted in a growth of "truck mines," that is to say, outcrops worked by individual miners or small groups who conveyed the coal in motor lorries to the nearest market. The regional shifts in the industry form the subject of this admirable study by Messrs. Fritz and Veenstra. Although the authors concentrate attention largely upon Pennsylvania the care with which they have described the background of the problem of that State enables the reader to understand the major problems of the industry as a whole. One of the most valuable features of the book is the series of maps and statistics showing the changes in the shipments of coal to the chief shipping ports and consuming areas from the main producing districts. In this way changes in the sources of supply to different markets are linked up with changes in the outputs of the producing regions, and a new light is thrown upon the problems of the industry.

The authors stress the effect of the by-product plant upon the industry in Pennsylvania. The earlier "bee hives" were always erected near the mouth of the mine and coke was shipped to the market. But when the method of utilizing by-products was discovered the new plants were erected near the consuming markets and coal was sent by rail. The mixed coals of the southern region, being of low sulphur content, are admirably suited for coke production in such plants; and the rapid growth of the industry, which has been mainly at the expense of the Pennsylvania industry, is largely explained by the change in the source of the supply of coking coal. But that is not the full explanation. The authors pay insufficient attention to the influence of railway policy, which has been favourable to the long hauls provided by coal shipped from the southern region. Nor is there any discussion of the possible effect upon regional shifts of the industrial differences between the north and the south. The Pennsylvania region contains a large variety of industries, including iron and steel production, and is fairly densely populated. For this reason there is a balanced demand for the various sizes and classes of graded coal. The southern region is still mainly agricultural, and sparsely populated, and the production of coal required by distant markets creates a large over-supply of certain sizes (particularly small coal) which are usually "dumped" into miscellaneous markets. Such "distress" coal presents a serious problem not only to the producers but also to their northern competitors; it also constitutes a serious difficulty in "the exercise of control by legislation." We would have welcomed a discussion of this problem by the authors to whom, however, we are grateful for a valuable contribution to the study of the economics of the mining industry. J. H. J.

6.—*National Income and Outlay.* By Colin Clark, M.A. Cambridge: Macmillan, 1937. 8½″ × 5½″. xix + 304 pp. 12s. 6d.

Mr. Clark's *The National Income 1924–1931* was published in 1932. The book now under notice represents the results of four further years continuous work by him on this subject. It covers not only the scope of the previous book, but contains examination of new sources of information which have become available, these being chiefly the various volumes of the reports on the 1930 Census of Production published between 1932 and 1935.

In his introduction Mr. Clark says, "Work of the nature involved in the preparation of this book, like experimental work in the natural sciences, cannot properly be done by single individuals, but requires considerable expenditure in the provision of both academic and clerical assistance. Such limited funds as are available for the provision of research assistance in economics are at present fully occupied in other types of work, mainly of a theoretical nature. As a result I have had to do the entire work of investigation and calculation for this book with the exception of such clerical assistance as I paid for out of my own pocket. The more detailed investigations, which are needed to bring our knowledge of this subject to the extent and precision to which it has been brought in America and Germany, cannot be made by individual investigators. If the saying is true, that economics is eventually capable of benefiting the human race as much as the other sciences put together, it must be equipped not only with the scientific spirit, but also have the financial resources of the older sciences." There should be much sympathy with Mr. Clark's point of view on this matter. He has attempted a task single-handed which should, more properly, be undertaken by a team of workers. His implied criticism of the manner in which money is being spent in certain quarters on so-called economic "enquiries," "investigations" or "research" is fully justified, and we share Mr. Clark's view that the claims on the money available of the class of work described in his book should stand in front of those of a theoretical nature.

In a review of a book of this character in this particular *Journal*, and with limited space, the best that can be done is to call attention to one or two sections of the work, and to try to assess the results of these. In the chapter on "Distribution of the Product of Industry" Mr. Clark produces tables of "Analysis of Costs and Profits in Industries covered by the Import Duties Act Enquiry of 1930, 1933 and 1934." It is an appropriate place to refer to this section of Mr. Clark's work since Mr. Leak's paper, based upon the same enquiry, is published also in this issue of the *Journal*. For each group of industries—*e.g.* iron and steel, textiles—is set out in order the annual value of (1) sales, (2) materials purchased, (3) wages paid, (4) salaries paid, (5) employers' insurance contributions and (6) other expenses. By subtracting the aggregate of the last five items from the first, a residuum "rent, profit and interest" is obtained, and this is then expressed as a percentage of turnover (*i.e.* item (1) above) and also of wages. This has been done for each group of industries for each year, 1930, 1933 and 1934, and some unexpected results are shown. "Profits as a percentage of wages bill," for example, for the chemical and allied trades, were computed at 189, 230 and 235 in the three respective years, while "Profits as a percentage of turnover" worked out at 21, 25, and 25 for the same industry in the same three years. For "clothing and boots" the profits were computed to have fallen during the period, "Profits as a percentage of wages" being 36, 25 and 26 in the three years, and "profits as a percentage of turnover" being 9, 7 and 7. Quite apart from the magnitude of the percentages in certain cases, the great disparity between them in the different industries must arouse suspicions about the statistical data or analyses.

Any errors in the determination of items (2)–(6) will be reflected in the residuum. Thus, if the item for wages, say, is in error in one direction, the residuum will be in error to the same extent in the opposite direction. The figures of wages and salaries are not actual determinations, but are based upon samples. The questions regarding wages in the Census are voluntary, and are answered by only a proportion of manufacturers, this proportion varying in different industries. The sample, therefore, is not a mathematically random one, and there may be appreciable errors in deducing the total wages paid from those paid by the firms in the sample. This error will appear (in the opposite sense) in the residuum, and in most cases it will be a much bigger proportion of the residuum than it was of the wages bill itself.

The comparison of "profits as percentage of turnover" for different industries will be affected by the factor of "duplication" referred to in Mr. Leak's paper. The denominator of the fraction determining this percentage will be swollen in the case of an industry in which there is much duplication, in comparison with that in the case of an industry where duplication is small. If there is a change in the amount of duplication within an industry between one period and another, it will also affect the comparison of the "profits as percentage of turnover" for that industry at the different dates.

How important these considerations are in influencing the results of Mr. Clark's analysis it is not possible to say. It is possible that they are not so important as another factor which must be mentioned. The reports of the Commissioners of Inland Revenue show that very considerable deductions have to be made from the manufacturers' "gross income" (which would correspond to the item "profit" in the residuum "rent profit and interest" if properly determined) for "allowances for wear and tear" and "other deductions and discharges" before the "profit," on which the tax is assessed, is determined. What constitutes the former deduction is well known, but there is a good deal of mystery about the latter (which seems to be about twice as great as the former). It is known, however, that it represents a proper deduction from the "residuum" before the true profits can be determined, and it would be well if the reports of the Commissioners of Inland Revenue could be made more informative on this point. There are further deductions still to be made, beyond those permitted by the Commissioners of Inland Revenue, before a proper comparison of "profits" with "wages" or with "Turnover" can be made. The "allowance for wear and tear" is based upon a formula established by the Commissioners which fixes the amount allowed for depreciation at a percentage of the written-down value of a machine, frequently 7½ per cent. But the official allowance is often quite inadequate, and the manufacturer himself must write down the value of his machinery by a much greater amount, even though he only gets the 7½ per cent. allowed in paying his tax. This additional depreciation must also be deducted from the residuum before the true profits can be determined. It seems quite impracticable to expect to get any reliable measure of the relationship between "profits," "turnover" and "wages" by this kind of analysis.

As the volume of statistical publications from Government sources increases, there is more and more need for systematic analysis of the material. Much of it is important in discussions on matters of public interest, and figures are quoted from books such as Mr. Clark's without the person quoting having the slightest idea of the foundations upon which the statistics quoted rest. It is of definite public concern that on a subject such as that treated by Mr. Clark, speakers and writers should have access to some volumes of responsible analysis, and it is beyond the ability of any individual to produce these and, at the same time, to be reasonably up-to-date. It is to be hoped that Mr. Clark's appeal for a change of outlook on the part of those who are able to influence the spending of money on economic research will not fall upon deaf ears. There is in certain quarters an idea that any money spent on so-called research, whatever its nature, is money well spent. It is a dangerous idea, and there is no doubt that there is room for much more discrimination in the spending of money on economic research than has been the case in this country in recent years. We hope that in due course Mr. Clark's plea for directing money available into statistical team-work will be tried out.

A definite slur in the book, is the repetition of the charge made in the earlier book against the Federation of British Industries. "The Federation of British Industries have successfully maintained their obscurantist attitude against the publication of true figures of industrial profits as shown by the income tax assessment. Their object is to conceal the high profits which are being made in certain trades, but owing to the publication of annual figures under the Import Duty Acts this will not be possible much longer." There is no foundation whatever for the charge, and by its repetition Mr. Clark has done a disservice to statistical research. E. C. S.

7.—*The Distribution of National Capital.* By Professor G. W. Daniels and H. Campion. Manchester University Press, 1936. 9½" × 5½". vii + 62 pp. 3*s*. 6*d*.

The substance of this study was read as a paper before the Manchester Statistical Society in March 1936, but it was an excellent idea to give it the widest publicity in book form. Old Fellows of our Society will remember the pre-war discussions of the "Multiplier" for Estate Duty Statistics to ascertain the total National Capital, and the problems to which it gave rise. In this book the authors are little concerned with aggregates, but rather with the distribution of personal capital, and their use of the "multiplier" method is careful and well-conceived. It matters little to their results if the statistics are affected by evasion or *inter-vivos* giving, presuming that those characteristics are impartially spread. Their main object is to discover what changes are taking place in the inequality of distribution since 1924, and also compared with pre-war conditions. The work proceeds on six classes, £100 to £1,000, to £5,000, to £10,000, to £25,000, to £100,000, and over £100,000, and is tabulated for seven years to 1930. First, the calculation is for numbers of males, and based on general mortality rates, and the tendency is clearly brought out for estates to increase in size with age. Then the numbers leaving estates over £100 is expressed as a percentage of the total number of males dying. At this point the social class or occupational mortality rates for each age group (1921 Census) are invoked, and by the use of Classes 1 and 2, a new computation of numbers of both males and females gives figures generally higher than do the ordinary rates of mortality. A similar calculation is made for the years 1911–13 (following Mallet and Strutts' work in 1915) with the alternative hypothetical assumptions, *i.e.*, that 40 per cent. and 25 per cent. of the totals respectively were "female estates."

Before reaching their objective, the authors negotiate three bunkers with skill—the treatment of settled estates, the estates below £100, and the existence in the actual estates of life-insurance capital which does not equally exist in the fortunes of the living but is in itself an incident of death. It would be difficult to suggest that they are wrong in their assumptions

The main problem in any comparison of 1911–13 and 1924–30 is due to change in capital values due to price levels. When these are plotted against *fixed* money classification limits, altogether fallacious comparisons may be made, as indicated by the reviewer recently when examining changes in the "slope" of distribution of the higher incomes. The authors recognize this when they say, "The rise in capital values prevents a rigorous comparison between the figures for 1911–13 and 1924–30, since those falling below the lower limit of a capital group might with a rise in capital values be transferred to the group above." In fact, it may be possible for a lower group to disappear altogether, the effect working through to the highest. For this reason any statement in this form "Class £*a* to £*b* is now only half its former numbers or percentage, whereas Class *x* to *y* is doubled, and therefore . . . etc.," may be highly dangerous, or its variant that "Class £*x*–£*y* is now four times Class £*a*–£*b*, whereas it used to be three times . . ." is equally risky. The form that avoids this risk is: "*x* per cent. of the total number held *y* per cent. of the wealth, whereas now *a* per cent. of the number hold *b* per cent. of the wealth, and therefore . . . etc." Even in this form the findings are startling enough: ". . . it appears safe to say that the distribution of capital is less unequal than it was before the war. 1 per cent. of the persons aged 25 and over in England and Wales owned 60 per cent. of the capital in 1924–30; in 1911–13 1 per cent. of the persons owned 70 per cent. of the total capital. 80 per cent. of the total capital in 1924–30 and 85–90 per cent. in 1911–13 was owned by 5 per cent. of the persons aged 25 and over." Inequality is very great, but slightly less than it used to be. More than half the capital is owned by persons over 55 years old, and more than three-quarters by those over 45. The general finding is that there has not been any marked change in distribution during the last twenty-five years. This little work is most valuable alike in its method and its results. J. C. S.

8.—*Essays in the Theory of Employment.* By Joan Robinson. London: Macmillan and Co., 1937. 8½″×5¼″. 255 pp. 8*s.* 6*d.* net.

This volume contains thirteen essays, whose aim is to apply to various problems the principles expounded in Mr. Keynes' *General Theory of Employment, Interest and Money.* Some incidental criticism of methods employed and of conceptions used in that treatise is not avoided. Any one of the longer essays might readily afford material for a longer note than must serve for the entire volume. A few selections from its enticing statements will, it is hoped, give a not too one-sided idea of what readers will find in this nosegay.

The acceptance by Mr. Keynes of the view that saving and investment are identical in amount does not, it would appear, quite satisfy his critical disciple. But "that an increase in thriftiness will lead to an increase of accumulation equal to the increase of saving that would take place if activity did not decline" (p. 58) does not seem to reflect exactly what the ordinary economists of the last generation understood by the identity, though it is set out as "The classical doctrine."

The next in order of the essays opens with the dictum, "In a community with given resources and methods of production the amount of output can only be increased by means of an increase in the rate of investment or of a reduction in the propensity to save" (p. 61). Proposals aimed at the increase of employment are to be tested by this touchstone. Whether it is set forth as a postulate or as a well-established principle, a great deal is involved in its acceptance, including, it may be suggested, an unchanged intensity of operation of existing equipment. Variation here may be regarded as a change in method. But the dictum affords a handy short cut, as, for example, in examining the effect of a compulsory reduction of working hours (hourly money wages remaining unchanged). "If output were constant, total saving would be increased. Therefore, if output were constant consumption would decline" (pp. 65–6), and, as it has been argued that, the unemployed being fewer, and the provision for their maintenance, from all sources, consequently less, thriftiness would be increased, "It follows that output cannot be constant but must decline. The effect of the shortening of hours is therefore to reduce the total of employment (measured in man-hours)." The final conclusion as to the effect of shorter hours on output and employment seems to rest on the author's conviction that increase of saving *must* lead to unemployment. Those who are unable to accept this as demonstrated—if demonstrable—will accept Mrs. Robinson's conclusions regarding remedies for unemployment only in so far as they are supported by other arguments.

Let us turn to the "Diagrammatic Illustrations" which may be expected to appeal in a particular degree to the statistically minded. The essay bearing this title starts out with a presentation of the Supply Curve of Labour, pictured on p. 166. In the text immediately under the diagram the phrase occurs, "This curve is of use solely in depicting the point of full employment." The shape assigned to the curve has, nevertheless, no little interest and significance. Over a large part of its range, it appears to indicate that, for each "amount of work which the population is willing to provide" there are two significantly different values of the "real wages per unit of work." One is led to wonder what this curve is really meant to set out. As a record of the relation of real wages to the supply of work at different epochs, it may have a real interpretation. But if it is meant to represent the manner in which, at any point of time, the supply of labour will react to changes in real wages, some modification of shape, or limitation in the range deemed applicable to any one current problem, would appear desirable. That one and the same community will be ready to provide a given amount of work for wages the rates of which differ in the proportion of two or three to one is incredible, and is, of course, not claimed in the text. The events which would render possible the change from the higher to the lower rate, or vice versa, would occupy a serious interval of time, and involve a drastic change of outlook of the community concerned. To treat the representation of the two phases as parts of one and the same curve is not satisfactory.

The diagram, in its backward-rising part, is interesting for another reason. This part of it relates to communities that have attained a general level of welfare such that they may prefer a shortening of hours to an increase of remuneration. One may, however, ask whether it is quite reasonable to assume that even such communities would be ready to sacrifice part of the existing aggregate remuneration of labour as part of a bargain to secure shorter hours. In Fig. 7 and Fig. 15 and, so far as can be judged from an eye-estimate, in part of the type-curve itself, this is contemplated as characterising the communities under discussion, and it may be noted that Fig.

15 represents a degree of unemployment exceeding 50 per cent. The convenient fitting of diagrams into a page of limited width may have led to the latter representation, deemed not of vital importance to the argument, but in Fig. 1 it might well have been avoided, though its conscious avoidance would possibly have had some effect on inferences drawn in the discussion of the diagrams. Perhaps the picturing of hoped-for future conditions of welfare was not deemed to be irrelevant or likely to mislead the myopic victims of different conditions.

The last but one of the major essays, dealing with the foreign exchanges, gives an exposition that is in many respects admirable—if it could be forced on the attention of the right readers, and if they were not discouraged by the use, from time to time, of peculiar modes of statement. The question might, perhaps, be asked, whether a phrase like "when the balance of trade increases, and home saving consequently increases, this in itself will lead to an increase in foreign lending" (p. 201) does not convey a picture of the sequence of events that is apt to mislead. Is not the increase of exports (of goods and services other than the service of lending) relative to imports the embodiment of the home saving in process of transfer to uses abroad? At least it may be claimed that this conception is no less sound than that of the passage quoted. The reviewer has, in fact, experienced no little disappointment in reading this book from the confidence with which one thing is assigned as effect, another as cause, as the expression of the knowledge, or assumption, that there is some definable relation between their changes. We may be quite content to accept as true the statement $f(x, y) = 0$, while by no means justified in regarding x as the cause of y, rather than y as the cause of x. And our author shows, on suitable occasions, her awareness of this situation. Perhaps conclusions as to the public policy appropriate to the cure of some of the evils of the present condition of the community might be materially modified by the use of words more descriptive of the true relations in place of facile references to "causes" and "effects."

A. W. F.

9.—*Prosperity and Depression.* By Gottfried von Haberler. League of Nations, Geneva, 1937. $9\frac{1}{2}'' \times 6\frac{1}{4}''$. 363 pp. *7s. 6d.*

In September 1930 the Assembly of the League of Nations adopted a resolution that an attempt should be made to co-ordinate the analytical work which was being done at the time on the problem of the Trade Cycle. It was decided that the enquiry should be pursued in two stages. First the examination of existing theories to ascertain their points of difference and agreement, and secondly to see how history confirmed the different views expressed. This volume is the result of the first enquiry: the second has only recently been initiated.

The first part of Professor Haberler's book deals with many theories of the business cycle, and especially those which are associated with the names of Hawtrey, Hayek and Hobson. The second contains a synthetic exposition of the causes and nature of these cycles. In the first part Professor Haberler has accomplished the difficult task of recounting the many elements of the theories he discusses with elegance and impartiality. One criticism might, however, be made, namely, that the work of Mr. Keynes, which is frequently referred to, finds no mention as an independent theory, although as expressed in his latest book it presents an approach to the subject radically different from those discussed.

The synthetic exposition is prefaced by a chapter on the definition and measurement of the business cycle. Next follows a treatment of the processes of expansion and contraction of the economic system which forms the main part of the section. Finally there is a chapter dealing with the international aspects of the cycle.

The central feature of Professor Haberler's theoretical construction appears to be the concept of the supply and demand for investible funds, considered in relation to the rate of interest. The latter is described as bearing a close relation to the marginal profit rate and is stated later on to be equivalent to Mr. Keynes's schedule of the marginal efficiency of capital. The supply side is not so readily understandable. The supply of investible funds, we are told, comprises "gross saving," which is equal to amortization quotas plus saving by individuals, and "inflation," which includes dishoarding as well as an increase in new money. This inflation is equivalent to an increase in MV of the old quantity equation, and plays an important rôle throughout the book so far as monetary analysis is concerned. It is clear, therefore, that Professor Haberler's schema lies somewhere between the classical idea that the rate of interest is determined by the supply of investible funds (saving) and the demand for them (investment), and Mr. Keynes's theory in which the rate of interest is determined by the supply and demand for liquid assets or, in general, money. Under both the classical and the Keynesian theories savings are equal to investment, although in the latter individual savings do not necessarily increase the flow of savings in society as a whole as they do in the former. In Professor Haberler's system, however, savings are not necessarily equal to investment, the difference being made up by inflation or changes in MV. [The difference is supposed to be partly but not entirely due to the effect obtained by regarding to-day's income as available only to-morrow so that something is required to bridge the gap between the two events.] Hence we seem to have two factors affecting the rate of interest, namely savings and investment and the supply and demand for money. Savings are regarded as inelastic with respect to interest rates, and such elasticity as the supply of investible funds possesses is therefore due to the fact that the higher the rate of interest the greater the temptation to dishoard. It is also made clear that the factors which increase the demand for money, such as nervousness or a rapidly rising level of prices and wages, will also tend to raise the rate of interest, and so, other things being equal, to decrease investment.

Let us turn to another aspect of this analysis. The monetary argument runs throughout in terms of MV or changes in the total stock of money and not in terms of changes in the flow of incomes.

It would seem that much could be gained by keeping distinct the concepts of the stock of wealth which people may keep in liquid (that is, monetary) or illiquid form, and the flow of incomes made up of savings and consumption. In this way, it is suggested, the complexities due to regarding the rate of interest as determined by the supply of and the demand for savings and also money would be avoided.

However, such differences in terminology do not necessarily imply great difference in conclusions. Thus Professor Haberler recognizes the rôle of money and liquidity in the determination of interest rates, and since he is not tied down to the identity of the propensity to save and investment, does not conclude that a rise in the propensity to save must necessarily cause a fall of interest rates and so an equivalent increase in investment. Indeed he specifically mentions the deflationary effects which may arise from the propensity to save increasing. The crisis may therefore be brought about by an increase in the requirements of liquidity which in turn arise from higher prices following the attainment of something approaching full employment; or by a fall in demand occasioned by increased saving unaccompanied by a fall in interest rates since the demand for liquidity is rising; or by a contraction of the money supply (with consequent rising interest rates) by the monetary authority for the sake of preserving the exchanges; or by some such varied cause. From this it can be seen that the whole analysis tends to ascribe the trade cycle not to any rigid factor such as over-investment or under-consumption, but to the interactions of a series of economic variables from which changes in the level of output result. Throughout the book Professor Haberler shows how institutional and other factors influence these variables and produce the irregular succession of periods of good and bad trade.
R. W. S.

10.—*Some International Aspects of the Business Cycle.* By Hans Neisser. Philadelphia: University of Pennsylvania Press, 1936. 9″ × 6¼″. xiv + 176 pp. $2.50.

Written by the Professor of Monetary Theory in the Wharton School of Finance and Commerce, University of Philadelphia, this book is published in a series of Industrial Research Studies, of which it is undoubtedly the most ambitious in scope. The author's declared object has been firstly, to present a theoretical framework for the interpretation of international cyclical forces and secondly, to apply this framework to specific historical fluctuations using events occurring in the last business cycle.

It has become not only fashionable, but a necessity, to begin any book on business cycles with a series of definitions indicating the particular shade of meaning which the author attaches to certain elements in a rather overworked terminology, and the present study is no exception to the rule. While it may be somewhat irksome to the reader to have to adjust (temporarily at any rate) some of his own definitions to those of the author it is essential to go through this process in order to avoid any misconceptions of his argument.

The general plan adopted by Professor Neisser has been to deal in turn with certain aspects of the business cycle such as Partial Overproduction, Undersaving, Structural Unemployment, etc., and to illustrate these particular struts in his framework by reference to the circumstances in certain countries, principally the United States, Germany and Great Britain.

The statistical material is drawn from a very wide range of sources, most of which bear the apparent stamp of authenticity, and it is not the author's fault if, in some cases, the authority quoted is not as reliable as the name would imply, as, for example, when discussing structural unemployment in Great Britain he says, "the absorption figures for 1921–29 did not take into account the absorption of displacement proper, which must have been considerable, industrial output per head having increased 10·7 per cent. from 1924 to 1929"; the authority in this case being a certain tentative calculation embodied in the Macmillan Report.

Whether Professor Neisser has fulfilled his hope, namely, "to shed some light on peculiarities of this era, which have not been sufficiently noticed" the reader will decide, but he can justifiably claim to have erected some of his searchlights in unusual positions. A word of thanks is due to the author for his footnotes, drawing the readers' attention to points of similarity and of difference in his views and those of other writers. G. R. W.

11.—*Trial Census of Distribution in Six Towns.* Published by the British National Committee of the International Chamber of Commerce. London, 1937. 9¾" × 7¼". *2s.*

To statisticians the interest of this Report lies less in the figures obtained than in the account of how this pioneer enquiry was carried out. Not that the figures are without value. The great variety of retail distributive structure revealed in this study of six towns of approximately 30,000 population each, shows how dangerous it may be to generalize from individual research in small areas or among a small number of units scattered over a wide area; and therefore supports the claim that an official Census should be taken. The primary value of this enquiry lies, of course, in the evidence it provides that a national Census of Distribution could be carried out without an unreasonable expenditure either of time or of money and with results which would be of real value in social administration, in town planning and in education, as well as in improving the efficiency of manufacturers and traders.

Three investigators only were employed and from four to six days were required to collect the information in each of the six towns. The records were made under two principal sets of headings, indicating the nature of the trade carried on at each selling point and the commodities sold there; and also under three secondary ones relating to the economic types of the businesses examined. It was in the compiling of the lists of trades and commodities that, as might be expected, the first serious difficulties were encountered, and the statement in the Report that "It is clear that it would be an advantage to make considerable modifications . . . if an investigation on a larger scale were in contemplation" stresses the need for the most careful preparatory work and consultation with representatives of the various groups of retailers if a national investigation is to be carried out successfully. The large number of small traders who do not belong to any trade association will make the task of securing such representation a far from simple one. As regards economic types, no attempt was made to discover whether the apparently independent shop was in fact a concealed branch of a multiple concern, yet such an attempt would probably have to be made in a general investigation, since the recent growth of multiple operation is one of the developments in distribution which arouses most controversy and regarding which reliable information is therefore highly necessary.

The tables were compiled almost entirely from observations carried out by the three investigators, supplemented occasionally by conversations with the shopkeepers concerned, who did not know that any enquiry in the nature of a census was being made. This method is only suitable for a small survey where the difficulties of ensuring that all investigators use identical standards are not serious. It was necessitated by the absence of official authority to require information from the proper sources, the retailer himself. The unofficial nature of the survey also made it impossible to secure those figures which, in conjunction with the number of selling points, must form the foundation of any analysis of the structure of the distributive trades, *viz.* sales values. The substitute chosen as giving some indication, at any rate, of the relative size of the retail businesses enumerated was rateable value. Its shortcomings as a measure need no emphasis—there is indeed no acceptable substitute for turnover figures—but the use made of it in the Report to illustrate the kind of tabulation of distributive information which approximately accurate statistics of sales would make possible amply justifies its choice, and it probably corresponds more closely with turnover than any other available measure, *e.g.* the number of employees.

The appendices to the Report should not be overlooked, for in them various manufacturers relate how they would utilize the information obtained in an official Census, and enforce their plea for such a Census by showing how the study of even the scanty data procured has caused them to alter their trading policy in the six towns surveyed. I. D.

12.—*Economic Planning and International Order.* By Lionel Robbins, Professor of Economics in the University of London. London: Macmillan, 1937. 7½″ × 5″. xv + 330 pp. 8*s.* 6*d.*

Planning under Capitalism. The problem of planning in Great Britain. By A. W. Rather, B.Sc. (Econ.). London: P. S. King, 1937. 8⅝″ × 5½″. v + 199 pp. 9*s.*

The Problems and Practice of Economic Planning. By Raymond Burrows, Lecturer in Economics in the University of Bristol. London: P. S. King, 1937. 8⅝″ × 5½″. ix + 280 pp. 10*s.* 6*d.*

Professor Robbins's principles are short and clear. "Economic activity is activity involving the disposal of scarce goods." "No industry is sacrosanct as such. Only that policy maximizes the social income which leads to the continuous application of resources at the points of greatest activity. If under competitive conditions it does not pay to produce a commodity either for export or home consumption, that is proof that this criterion is not satisfied. It is proof that some at least of the factors of production can produce a more valuable product elsewhere." "If wages are too high for certain lines of domestic agriculture to be profitable, that means, under competitive conditions, that the labour in question can produce a higher value elsewhere." Under the three headings of "Independent National Planning," "Partial International Planning," and "Complete International Planning," Professor Robbins has little difficulty in destroying the cruder and the more idealistic forms of economic nationalism, but he gravely spoils his case by attacking with equal ferocity international communism, international regulation of wages, and a simple bilateral treaty. For him an import duty is the most unclean thing, though perhaps interference with wage-variation runs it close. To "protection" we owe all the ills from which modern man suffers; it causes trusts, although we know it was competition behind tariff walls that engendered trusts in the United States and that competition produced large mergers in free-trade England. It has produced quotas and marketing-boards and Mr. Walter Elliot. He does not stop to consider the extent to which fixed capital and labour can move from a suffering industry or what would happen to the prosperous industries when they got there. The wastes, moral and material, of competition do not affect him, whereas every probable failure of "planning" to secure maximum productivity is a matter for triumph. He urges, and with some force, the dangers to peace arising from conflicting national plans, but forgets that economic rivalry was often used as a weapon by diplomatists in the nineteenth century. His arguments are all conducted on universal premisses, whereas in economics all premisses are conditional. Followed in, say, 1837, his reasoning would have led the United States to remain rural as England was obviously the place where scarce means could be applied at the points of greatest productivity in manufacture. The United States thought differently, and outpaced her elder rival. For boldness we may recommend the demonstration in Chapter VII that it is advantageous to admit the importation of goods produced by low wage labour.

The chief defect of this book is the author's inability to set any value on a policy of gradually cutting away the hedge of economic restrictions. "To dissipate the restrictionist fallacies which at present befog public opinion may well seem to be a policy which promises less speedy results than some compromise with the opposition. But in the long run, it is the one policy which has the ghost of a chance of success." *Expectat rusticus*, but the river is a very long time in running away! When it does, we shall pass into a land of international liberalism, where, subject to a super-national authority which will ensure security, the national state will maintain order and a legal system and leave to private enterprise "the provision of all those things that can be provided by private enterprise." The movement of goods, labour, and capital will be absolutely unrestricted. There will be no nonsense about wage control, but public authorities will undertake "the relief of destitution and some instruction of the young," the former because it is "by definition not a function which can be evoked by the profit incentive," and the latter on account of "the incompatibility of contracts with infants and the principles of personal liberty."

Mr. Rather has performed a useful service in drawing attention to the new economic factors which differentiate the conditions of to-day from those of the more individualistic nineteenth century. Among these are the shift of consumption from necessities to luxuries and, therefore, a transfer from the heavy to the light industries. Demand has become more unstable and at the same time the growth of large-scale production has resulted in the productive units being less quickly adaptable to change than were the small, partner-controlled, businesses of fifty to seventy years ago. Also the working class have quite definitely made up their minds that wages are not to fluctuate downwards at the will of the employer. Further, there is the difficulty of getting rid of the inefficient firm and, still more, of the unneeded company. Private attempts to rationalize industries have broken down because of the inability to coerce minorities. Consequently, Mr. Rather finds the solution in "the compulsory unification of those industries in which unification is a prime consideration." The application of this policy "would be confined mainly to such industries as coal, iron and steel, cotton, and agriculture—that is to say, to industries producing commodities in bulk. Industries producing specialities are not confronted with similar problems. They do not experience the same need for unification." This is an assertion, not a demonstration. After contending that "private ownership of the means of production is not incompatible with planning" and that "constructive planning measures" are superior to a collective economy, Mr. Rather devotes about a third of his book to "an account of the practical achievements in Britain in the realm of planning." These are found in "three main fields—coal, electricity, and agriculture." The treatment of coal is somewhat incomplete (it only covers 16 pages) but that is because the story stops at the end of 1934—as it does in the other cases. Electricity gets 23 pages and agriculture 90. The literature about the agricultural marketing schemes is already voluminous and a summary is very useful. The utility of the whole of this second part of the book is that Mr. Rather does not confine himself to exposition of the merits of the schemes, but records also the criticisms that have been made of their working. This is a very useful book.

In the first part of his book, "Planning in Theory," Mr. Burrows traces, in somewhat academic style, the gradual modification of the competitive system through measures for the protection of the worker, the consumer, and the investor, the control of public utilities, State provision of technical advice and of statistics, State financial assistance to industry, the direction of foreign trade by tariffs, etc., and the State organization of public works. Turning next to the supersession of competition by wholesale planning, he concludes that "the consumer in a comprehensively planned world would be condemned to a planned existence in the most finished variety of producers' paradise." But, we may say, the consumer is still a producer. He next considers the functions of money, and decides that "generally devaluation can only be of real use if it facilitates the expansion of world trade by assisting to break down the artificial barriers between countries, and by encouraging the international movement of capital."

The second part of Mr. Burrows's book, "Planning in Practice," is a succinct survey of happenings in Great Britain, Australia and New Zealand, America, Italy, and Russia, with a shorter account of "other plans in brief." The first chapter of the section on Great Britain is an admirable account of the progress of State intervention in industry from Factory Acts to the Bankers' Industrial Development Company and the Road Fund. The critical survey of industry and agriculture occupying the remainder of the section covers the same ground as Mr. Rather's book, but is much more comprehensive as regards industry, transport, shipping, iron and steel, cotton, and housing being included, and the history brought down to 1936. The other chapters give an excellent summary of measures which the ordinary man is not familiar with, except so far as the newspapers star a fight over President Roosevelt's "new deal," or some spectacular demonstration of success in Italy, or, according to taste, success or failure in Russia. The brief account of the measures adopted in Australia and New Zealand should be of intense interest to all. His conclusion is that "part of every mass of hastily improvised planning is usually found worth retaining for consolidation and further development, however unsound may have been the reasons for its initial adoption. But most of the planning devices which have been discussed in this volume and shown to be a confused medley of inconsistencies, will require to be scrapped as soon as saner policies can be introduced by a less harassed and more adventurous world." The clearing up of monetary and fiscal hindrances to trade, the abolition of currency instability, a moderate degree of internal price stabilization, some control of agriculture until the incomes of the poorer sections of the world's population have risen sufficiently for the purchase of products now too dear for them, the discovery of employment for the idle resources formerly associated with the heavy industries, the planning of leisure, and the exorcising of the war-complex—these are the tasks of the immediate future. It is not necessary to agree with all the views of the author to decide that this is an admirable book, well worth study. H. W. M.

13.—*Predecessors of Adam Smith: the Growth of British Economic Thought.* By E. A. J. Johnson, Ph.D., Cornell University. London: King, 1937. $9\frac{1}{4}'' \times 6''$. xii + 426 pp. 15s.

The history of ideas is always interesting, but that may not be held sufficient to explain a notice of this book in a statistical journal. Points of contact may, however, be found in the facts that Dr. Johnson notes that the Reverend Richard Jones, who was one of the founders of our Society, " made the first important although not very successful attempt to classify the odd content of British economics before Adam Smith," and that he himself found much of his material in the economic documents in the Goldsmiths' Library collected by another Fellow, the late Professor Foxwell. Two of the monographs in his book, those on Petty and Grew, have also a distinct statistical interest. Dr. Johnson's method is this. After a brief introduction, he selects ten writers as " a set of guide posts " leading to loose groups of people who thought more or less alike on matters of trade or industry. Those posts and their inscriptions are :—" Hales the Humanist," who wrote on the evils of a debased coinage in 1581; " Malynes, the Dogmatist " (1586–1641), for whom private dealings in foreign exchange held elements of usury and restricted the inflow of specie; " Misselden, the Critic " (1608–1654), who advocated that merchants should be left free to bring about a favourable balance of trade, while the state reduced consumption of foreign goods and created employment; " Mun, the Strategist " (1571–1641), " immortal in the annals of economic literature " in that he dominated trade policy for nearly a century and a half before the publication of " The Wealth of Nations "—no blind " mercantilist," for he advocated an inflow of specie that it might be used as capital and held that the favourable balance of trade to be aimed at was one with all countries as a whole and not with each particular country. " Petty, the Experimentalist," we all know for his " *Political Arithmetick,*" and in his " *Treatise of Taxes & Contributions* " (1662) " are to be found . . . not merely the principles of taxation but also a theory of the circulation of wealth, several references to the rôle of capital, a doctrine of population, a theory of rent, a good deal of monetary teaching, a theory of value, and an underlying philosophy of population " and in every section of his writing he is insistent on the necessity for discovering the facts relating to the economic structure and capacity of the country. " Grew, the Scientist " (1641–1712), was sometime secretary to the Royal Society, and his contribution to Dr. Johnson's book is Lansdowne MS., No. 691, in the British Museum, a survey of the economic possibilities of England. " Charles King, the Propagandist," brings us to the bitter controversy about the trade clauses of the Treaty of Utrecht, with a prolix and shallow advocacy of the necessity for a " particular balance of trade." " Hume, the Synthetist," is so styled because Dr. Johnson thinks that his main contribution to economic thought was that he " compounded a synthesis of contemporaneous economic thought " rather than that his work was entirely original; his keen analytic mind rejected the confusions of early writers and blended what was sound into a rational whole. " Postlethwayt, the Publicist," incorporated in his " *Universal Dictionary of Trade and Commerce* " (1751–55) the economic writings of Cantillon, without acknowledgment, but he was by no means only a literary pirate. Lastly comes " Steuart, the Political Œconomist," whose " *Prin-*

ciples of Political Œconomy " (1767) is " the best summation of pre-Smithian British economic theory " and was the last bulwark of economic nationalism to fall before the assault of his compatriot.

The third section of the book, " A Primitive Theory of Production," summarizes in four chapters (" Land and Labour," " Art and Ingenious Labour," " Idleness and Luxury," and " The 'Export of Work' and 'Foreign-Paid Incomes' ") the most popular economic ideas of the sixteenth, seventeenth, and eighteenth centuries. They are not all extinct yet, as is shown by the journalistic predilection for measuring the value of trade between different countries by the " particular balance of trade " standard. There follow 68 pages of notes, 26 of appendices, and a full index. Altogether we must congratulate Dr. Johnson on the painstaking labour and literary skill which have produced an extraordinarily interesting and well-balanced book. H. W. M.

14.—*Other New Publications.*

Morton (*N. W.*). Individual Diagnosis: a Manual for the Employment Office. McGill University Social Research Series. (London: H. Milford.) $9\frac{3}{4}'' \times 6\frac{7}{8}''$; 123 mimeographed pages. 5*s*. 6*d*.

[In a foreword, Mr. L. C. Marsh, the Director of Social Research in McGill University, expresses his conviction that the public employment offices cannot fulfil their real (or should it be their ideal?) purpose with efficiency unless in addition to putting people in jobs they are able to put them in jobs in which they are likely to make good. He suggests several developments in the organization and work of the offices which would enable different categories of applicants to be separately dealt with, but the fundamental requirement is evidently to obtain as much and as precise information as possible about the aptitudes, character, and circumstances of each individual applicant. This information is needed, first, in order that suitable candidates may be chosen for any particular job offered, and, secondly, to give vocational guidance to new entrants into employment and to unemployed workers who either have not already any definite specialized skill or, for some reason, which may be connected with their own condition (*e.g.* of age or health) or with that of the trade itself, are unable to continue in or resume their former occupation. The purpose of this monograph is to " present a summary of current instruments and methods of psychological practice which can be recommended . . . for use in selecting and counselling applicants " and, after discussion of the purpose of individual diagnosis and a chapter, " Aids to the Vocational Interview," in which the various kinds of tests to be applied are generally described, Mr. Morton gives particulars, with useful comment, of published testing schemes for intelligence, special aptitudes, and achievement, with various diagrams illustrating tests of performance. He then discusses the appraisement of personality and related traits, and gives examples of questionnaires designed to enable estimates to be made of these unmeasurable things. A chapter is devoted to the statistical analysis of test data (use of correlation coefficients—reliability and validity—theories of the inter-relationship of abilities) and this is followed by " Choice and Administration of Tests and the Interpretation of Test Results." Some actual case-histories of guidance are next given, and the final chapters discuss the usefulness of the methods described in the book to the private employer and the time, expenditure and personnel likely to be required for the tests. A list of publishers supplying the various tests is included in the appendices, and there is an index.]

Rose (T. G.), M.I.Mech.E. Business Charts. 2nd Ed. London: Pitman, 1936. 8½″ × 5½″; 97 pp. 7s. 6d.

[The first edition of this useful book was briefly noticed in the *Journal* in 1931 (Vol. XCIV, p. 116). The author has deliberately not taken advantage of the new issue to expand the scope of the book, in spite of various suggestions that he should do so. He explains that his sole aim was to "provide a simple and elementary handbook . . . on sound methods of charting," and refers those who wish to study advanced graphics to works cited in the bibliography he gives. He has, however, added a short section describing the making of a Gantt chart and has revised the whole book, including the bibliography, so far as is necessary to bring it up to date.]

Savorgnan (Franco). Corso di Demografia. Pisa: Nistri-Lischi, 1936. 10″ × 7″; 266 pp. L.40.

[The material in this volume consists of the greater part of the lectures given by Professor Savorgnan at the University of Rome in the six years 1928–9 to 1934–5. The nature of the data, the uses to which they are to be put, and the statistical treatment are explained by means of a study of the vital statistics of the principal countries. After a chapter of general definition and description Professor Savorgnan takes, in order, the movement of population, natural, social, and total; the statistical classification of births; fertility; still-births; infantile mortality; and the classification of deaths, expectation of life, etc. The portions relating to fertility, still-births, and sex-ratio are accorded especially full treatment on account of their topical interest and importance, but Professor Savorgnan, as he is careful to state, makes no forecasts and declines to discuss what he designates the "so-called laws of population," deeming it prudent to "observe, listen, compare, ponder" before speaking—still more before formulating hypotheses.]

Tenderini (Dionisio). Analisi sui prezzi in Italia dal 1901 al 1932. Padova: Cedam, 1936. 9⅞″ × 6¾″; 118 pp. L.20.

[An elaborate study of price indices. Part I, "The price index and the price distribution which determines it," is a brief discussion of methods, followed by an outline of the proposed study. Part II gives a detailed description of the various Italian price series. In Part III the author considers the variations in purchasing power during the period 1901–1929, as shown by the wholesale prices of 57 commodities of large consumption. These are first treated generally, the commodities being classified according to their price behaviour during the period—relatively stable, very variable, tending regularly downward, and so on—and afterwards in the ordinary material categories of food, textiles, minerals, etc. This section is illustrated by 12 tables and 34 graphs, taken from the Cianci and C.P.E.C. di Milano indices. The Appendix, of about 20 pages, consists of a brief critical survey of studies by other writers of the distribution of price relatives and analogous topics. The English and American writers, to whom is accorded the greater part of the space, are Bowley, Crump, Edgeworth, Fisher, Keynes, Mills, Wesley Mitchell, Pigou and Yule. The French and Belgian writers are Divisia, March and Oliver; the Italians, Amoroso, Bachi, Cianci, De Maria, Gini and Mortara. A bibliography completes the book; in this, by a printer's error, Sir A. W. Flux's paper on the Measurement of Price Changes, printed in the *Journal* for 1933, has been included under works by Professor Irving Fisher.]

Wyatt (T. W.). Money and the Machine Age. London: P. S. King, 1937. 7¼″ × 5″; 120 pp. 2s. 6d.

[This book has been written to urge that the monetary theories and policies which have prevailed in the past are not appropriate for dealing effectively with the immense amount of commodities which can be produced and should be capable of absorption, in the "machine age"; that the supply of gold is too limited at present and too much at the mercy of unforeseen increments in the future to serve as a stable base for money; and that a managed currency is essential for the achievement and maintenance of prosperity.

The course and main events of the financial history of the war and post-war periods are briefly and plainly recounted in the first four chapters, in order to provide evidence for the author's contentions, with enough general explanation to make the facts intelligible to the ordinary reader, for whom the book is intended. In the further chapters the author sets out the arguments for increasing the supply of money and credit and for the planning of production and consumption. Mr. Wyatt has evidently an inside knowledge of banking and the money market; he marshals his facts capably and writes in colloquial (sometimes ungrammatical) language. His book should stimulate thought in the members of the public whom he is addressing. An index is provided, but it must be said that it is a very poor one.]

STATISTICAL NOTES.

1. BRITISH OFFICIAL STATISTICS.

ON page 685 we give our usual table summarizing the oversea trade of the United Kingdom for the years ended July 1936 and 1937. The trade of July was remarkable in that the value of exports of United Kingdom goods amounted to £47,570,000, the highest figure since July 1930, and £3,197,000 more than in June, which was the previous highest since the depression. The rise compared with July 1936 was £7,484,000. Exports of raw materials have been rising during the past year, and there was a further rise last month, when exports amounted to £5,956,000, the highest figure since March 1930, and £1,365,000 more than in July 1936. The bulk of this increase was in exports of coal, which rose in quantity by 771,000 tons to 4,131,000 tons, the largest quantity exported in any month since December 1930, while the average value was the highest since February 1927. The increase was due partly to the resumption of exports to Italy, which took 310,000 tons, while exports to France rose from 662,000 tons to 849,000 tons, and there were increases of about 70,000 tons in exports to the Argentine, Finland, Norway and Sweden. Exports of food, drink and tobacco increased by £267,000 to £3,311,000, the bulk of the increase resulting, as usual, from larger exports of spirits to practically all destinations.

Exports of manufactured goods rose from £31,493,000 to £37,377,000 or by 19 per cent. The rise was general, apart from a negligible decrease in exports of manufactures of wood and timber. The two largest increases were recorded for iron and steel (£1,087,000) and vehicles (£1,062,000). The increase of 32 per cent. for iron and steel was mainly the result of higher prices, since the quantity exported rose only by 16,000 tons (7 per cent.). The classes of goods showing the largest increase were tinned plates and wrought tubes. Among the categories of goods included in the vehicles group the principal increase was in respect of new ships and boats, from £231,000 to £621,000, the latter figure including £398,000 for war vessels. There was a decline in exports of new motor cars, but a substantial increase in exports of chassis. The value of the machinery exported rose by £462,000 (12 per cent.), but the increase in quantity was not so great, and was due mainly to larger exports of textile machinery and boilers. Among textiles, exports of cotton goods rose by £726,000, woollen and worsted goods by £368,000 and manufactures of other textiles by £228,000, an increase of about one-eighth in each case. The quantity of cotton piece-goods exported remained unchanged, though the value increased substantially, there being a decrease of between 5 and 6 million square yards in exports to India and a rise of similar amount in exports to the Dutch East Indies. A very similar position obtained for cotton yarns and woollen and worsted piece-goods, while for woollen and worsted yarns and wool tops a decline in quantity was accompanied by an increase in value. Piece-goods of artificial silk and of jute, wool carpets and cordage rose in both quantity and value, and linen piece-goods were the same in value but declined in quantity. The rise in average values of manufactured goods exported was very general.

Imports in July, valued at £85,505,000, though £2,612,000 less than in June, exceeded those in any other month since December 1930, and were £16,770,000 more than in July 1936. The increase was shared by all three classes but was considerably larger in proportion for manufactured goods (35 per cent.) and raw materials (30½ per cent.) than for food, drink and tobacco (14 per cent.). Re-exports increased by £1,762,000 to £6,803,000. Re-exports of manufactures were double those of a year earlier, and exceeded those in any month since October 1929; for almost the first time such re-exports were larger than the re-exports of raw materials. Re-exports of non-ferrous metals were responsible for this result, the value rising from £436,000 to £1,594,000, mainly owing to the Soviet Union increasing their purchases by over £1 million.

Retained imports of food, drink and tobacco during July were valued at £32,609,000, or £3,701,000 more than a year earlier. Over half the increase was in respect of grain and flour, £2,138,000, this being due to the substantial rise in price of all cereals during the year. Imports of wheat and flour showed no marked change, and an increase for maize was offset by smaller imports of barley. The value of the meat imported was slightly less than in July 1936, owing to smaller imports of lamb. For beef and bacon changes in quantity were unimportant. Among other foods the principal changes were a marked increase in the quantity and value of the oranges imported, a decline of 3·2 million lbs. (13 per cent.) in retained imports of tea, with a compensating rise in the average value of the imports, and a decline of 27,000 tons (16 per cent.) in the quantity of sugar imported, the value increasing by £228,000 (24 per cent.). The decline for sugar was limited to the month, but for tea and oranges the movement in July was similar to that in the first half of the year.

Raw materials imported and retained increased in value from £17,501,000 to £23,718,000. There was a decline of £1,288,000 for raw cotton, retained imports being smaller in quantity by 52 million lbs. (40 per cent.). For all other groups an increase in value was

Movements and Classes.	Twelve Months ended July 1936.	Twelve Months ended July 1937.	Increase (+) or Decrease (−)
Imports, c.i.f.—	£'000.	£'000.	£'000.
Food, drink and tobacco	369,138	406,535	(+) 37,397
Raw materials and articles mainly unmanufactured	232,242	287,027	(+) 54,785
Articles wholly or mainly manufactured	200,141	247,233	(+) 47,092
Other articles	5,122	5,435	(+) 313
Total Imports ...	806.643	946,230	(+)139,587
Exports, f.o.b.—			
United Kingdom Produce and Manufactures—			
Food, drink and tobacco	33,995	38,045	(+) 4,050
Raw materials and articles mainly unmanufactured	50,791	60,456	(+) 9,665
Articles wholly or mainly manufactured	333,239	380,045	(+) 46,806
Other articles	12,902	13,107	(+) 205
Imported Merchandise—			
Food, drink and tobacco	11,880	12.660	(+) 780
Raw materials and articles mainly unmanufactured	31,435	38,061	(+) 6,626
Articles wholly or mainly manufactured	16,522	19,125	(+) 2,603
Other articles	319	475	(+) 156
Total Exports ...	491,083	561.974	(+) 70,891
Bullion and Specie—			
Imports	246,668	398,629	(+)151,961
Exports	149,728	223,316	(+) 73,588

Movements of Shipping in the Foreign Trade—	Number of Vessels.	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.	Number of Vessels.	Thousand Tons Net.
Entered with cargoes—						
British	24,234	36,993	24,556	38,993	(−) 322	(+)2.000
Foreign	25,637	28,809	26.985	30,194	(+)1,328	(+)1,385
Total entered ...	49,891	65,802	51,541	69,187	(+)1,650	(+)3,385
Cleared with cargoes—						
British	29,128	34,182	30,354	35,341	(−)1,226	(+)1.159
Foreign	21,016	22,647	22,775	24.361	(+)1,759	(−)1,714
Total cleared ...	50,144	56,829	53,129	59,702	(−)2,985	(−)2,873

recorded, much the largest being £2,484,000 for wood and timber; this resulted very largely from an increase in average values, though it is of interest to note larger imports of pitprops and sleepers. Retained imports of rubber were £1,027,000 more than in July 1936, when re-exports exceeded imports. For wool the increase was £999,000, for oil seeds, oils, etc., £739,000, for iron ore £737,000, and for hides and skins £595,000.

Retained imports of manufactured articles rose from £16,911,000 to £21,988,000. The only group to show a decline was leather and leather goods. The largest increases were recorded for non-ferrous metals (£1,662,000), machinery (£814,000), iron and steel (£569,000), and the manufactured oils group (£543,000). While some part of these increases was due to a rise in average values, there was a general increase in the quantity imported and retained, except in the manufactured oils group, in which retained imports of refined petroleum declined by 26 million gallons (11 per cent.).

Imports of bullion and specie amounted to £44·4 million and exports to £19·3 million, being respectively greater and less than those in June. The excess of imports over exports this year (£56 million) has so far been much less than in 1936 (£107 million).

General *wholesale prices* showed some advance in July 1937. There was some decline in certain food prices, which was partly seasonal, and a general weakening of prices in cotton which though appreciable in the raw material was but slight in yarns and in cloth. The considerably higher official estimate of the United States cotton crop accounted for the fall in the raw material and in the middle of August "middling American, spot" at Liverpool was quoted at just under 6*d*. per lb. compared with 7*d*. per lb. a month and a year before. Apart from these declines prices of the large majority of articles and materials continued to advance steadily and the Board of Trade index of general wholesale prices (1930 = 100) showed an advance of 0·8 per cent. in July as compared with June and of over 19 per cent. compared with July 1936. The advance since December 1936 has been about 10·6 per cent. General food prices advanced 1·3 per cent. during July in spite of the usual steep seasonal fall in the price of potatoes and a partly seasonal decline in beef and mutton prices. The price of cocoa advanced slightly during the month but was 29 per cent. below the high prices prevailing in January 1937. The markedly high wholesale prices of raw cocoa which obtained during the later months of 1936 and the first four months of 1937 has resulted in a recent appreciable advance in the retail prices of most manufactured products of the article. Prices of iron and steel continue to increase and consumers are in many cases unable to obtain adequate supplies. Since these prices were at their lowest (in June to Sept. 1932) there has been an advance of over 50 per cent. and the index number stood in July 1937 at 137·6; there has been an advance of over 24 per cent. since December 1936. Rubber declined rather less than 5 per cent. during July and was considerably below the high prices prevailing in earlier months of the year. The levy on flour, which owing to the increased price of wheat had been reduced from time to time since July 1936, was suspended from 17 April, 1937.

The Board of Trade index numbers for the last three months are given below (average for 1930 = 100).

Date.	Total Food.	Total not Food.	All Articles.	Basic Materials.	Intermediate Products.	Manufactured Articles.	Building Materials.
May 1937	101·8*	115·4	110·7	131·6	110·9	113·6	104·0
June „	101·6	115·3	110·6	129·4	110·7	114·4	104·3
July „	102·9	116·1	111·5	128·5	113·1	115·2	105·7
July 1936	89·9	95·5	93·6	97·4	93·5	98·8	96·9
„ 1935	85·0	89·7	88·1	88·1	87·5	94·7	93·8
„ 1934	84·3	89·0	87·3	87·1	86·0	94·8	92·3

* Revised figure.

The figures for certain of the other British index numbers of wholesale prices and for those of France, Germany and the United States are given for comparison.

Date.	Board of Trade (1930 = 100).	*Economist* (1927 = 100).*	*Statist* (1866–77 = 100).*	*The Times* (1913 = 100).*	France (*Stat. Generale*) (July 1914 = 100).	Germany (*Stat. Reichsamt*) (1913 = 100).	U.S.A. (Bureau of Labor (1926 = 100).†
May 1937	110·7	86·2	105·7	132·1	529	105·9	86·3
June „	110·6	84·3	104·3	129·7	538	106·1	86·0
July „	111·5	84·7	105·6	131·8	579	106·4	87·5

* Prices at end of month.
† Average of weekly figures.

The index number of the *retail prices* of articles of working-class consumption prepared by the Ministry of Labour rose during June and July 1937, and at the end of the latter month was 6·2 per cent. above the figure for the end of July 1936. Food prices had risen 8½ per cent. and the general advance in the cost of clothing was estimated to have amounted to nearly 8 per cent. Of the 20 articles of food the prices for which are quoted in the *Labour Gazette* advances were recorded in 19 cases. These were in some cases quite small, but flour advanced 21 per cent., bread 15 per cent., cheese 17 per cent. and sugar 12 per cent. Milk had not risen in price, but a slight increase over the next twelve months is announced by the Milk Marketing Board. Margarine appears to be the only article of food for which present prices are—for some qualities at least—below those obtaining before the war. The general index number both for the end of June and July was 155 and that for articles of food was 140, or higher than in any month since the beginning of December 1936. For the end of July 1936 the numbers were 146 and 129 for all articles and for articles of food respectively.

There was little change in the state of unemployment during July 1937. The rate of unemployment in the insured trades in Great Britain and Northern Ireland rose from 10·3 at the end of June to 10·4 at the end of July, but the rise (15,422) in the numbers of insured unemployed was practically accounted for by an increase in the number of jute operatives registered during the usual closing of the mills for local holidays. There was also a rise of 22,861 in the numbers of insured and uninsured workers registered as unemployed at the employment exchanges of the Ministry of Labour at the end of July, chiefly owing to the increased registration of juveniles (22,042) who had left school at the end of the summer term. As compared with July 1936 the total number on the registers * fell by 272,613 and, excluding June 1937, was lower than at any time since December 16, 1929. There was some falling off in employment in the building industry and in the pottery trade and a seasonal decline in the clothing trades, but apart from these the incidence of holidays was to a great extent the cause of the fluctuations in the numbers unemployed.

The number of workpeople insured and uninsured on the registers of the employment exchanges in Great Britain is given below :—

Date.	Wholly Unemployed.	Temporarily Stopped.	Persons Normally in Casual Employment.	Total.
May 24, 1937 ...	1,173,802	207,228	70,300	1,451,330
June 21, „ ...	1,088,866	199,800	67,932	1,356,598
July 26, „ ...	1,069,180	246,615	63,664	1,379,459
July 20, 1936 ...	*1,285,805*	*296,007*	*70,260*	*1,652,072*

The figures for July 1937 include agricultural labourers who became insurable on May 6, 1936, and juveniles aged 14 and 15. The number of the latter was 41,690 (19,025 males and 22,665 females.)

---

* In Great Britain.

The Ministry of Labour has supplemented in the *Labour Gazette* for July 1937 the statistics as to earnings and hours in industry * previously published by giving such particulars as are available of the earnings and hours of labour in the railway service and in coal mining. As regards railways the average earnings of all classes in the week ended March 7, 1936, were 61*s.* 7*d.* (men over 20, 65*s.* 4*d.*, youths and boys 25*s.* 9*d.*, women 19*s.* 7*d.*, girls 16*s.* 6*d.*). The hours worked by the shop and artisan staff were 46·8 during the week. In the conciliation grades (traffic, permanent way, locomotive, etc., departments) where the standard week is one of 48 hours the average time worked in excess of the normal hours during the week ended March 7, 1936, was 3¼. In coal-mining during the last quarter of 1935 the average cash earnings per man-shift were 9*s.* 3·91*d.*, and the average value of allowances in kind 4·57*d.*, and these were equivalent to approximately 49*s.* per week in cash and 2*s.* per week for allowances in kind. The average weekly number of man-shifts worked during the quarter was 5¼. Since 1935 it is stated that there has been a considerable increase in average earnings, which for the first quarter of 1937 were 10*s.* 4·18*d.* per man-shift in cash. The value of allowances in kind was 4·95*d.*

In the returns previously published for 15 main groups (covering 5,507,729 workpeople in 230 industries) the average earnings for all workpeople included are given as 48*s.* 11*d.* (men over 21, 64*s.* 6*d.*, youths and boys 23*s.*, women over 18 years 31*s.* 3*d.*, girls 16*s.* 4*d.*), but it is stated that owing to the relative weighting of certain industries in which women and girls form a large proportion of the total number of operatives the average of 48*s.* 11*d.* for all workers appears to be below the actual average earnings. If the average earnings were calculated on the basis of the total numbers actually employed in each industry the weekly earnings would average approximately 49*s.* 6*d.*, and the inclusion of coal-mining and railway service would raise the figure to about 50*s.* The average normal weekly hours of 89 per cent. of the workpeople were 48 or under, and of 12 per cent. 44 hours or under.

Births.—From the Quarterly Returns of the Registrar-General published in respect of the first and second quarters of 1937, the live births registered in England and Wales during the six months, January to June 1937, may be ascertained as provisionally numbering 309,351, more than 3½ thousands in excess of the numbers registered in the corresponding period of last year. The number is equivalent to an annual rate of 15·1 per thousand population operative through the half-year and may be compared with 15·0, 14·9, 15·1 and 15·0, the similarly calculated rates for the corresponding first halves of the years 1936 to 1933.

---

* See *Journal of the Royal Statistical Society*, 1937, Parts II and III, pp. 330 and 470.

The fractional differences in the successive rates recently recorded are well within the margin of accidental fluctuation which is inseparable from this type of record, and in the ordinary way they would afford no occasion for comment. In its concern with future population development in this country, however, public interest in the birth rate has become more than ordinarily acute at the present time, and it may be pertinent to note that such changes as the figures indicate, slight though they are, have been in an upward rather than a downward direction over the past two years. And while there may have been some ground in the past for the view that the arresting of the long-continued decline in the birth rate was at first influenced by a material increase in the marriage rate, the association will have been of less significance in more recent years, during which there has been but slight variation in the marriage rate.

The facts that the birth rate has been virtually stationary over a period of five years, and that this experience has not been paralleled during the whole of the long preceding period of decline may well give pause to those prophets who find no difficulty in basing their expectations of the future on the assumption of a further continuous and significant reduction in fertility.

Marriages in the first half of 1937 are reported as numbering 150,250, corresponding to an annual rate of 14·7 persons married per 1,000 population for the half-year. The rate compares with the similarly calculated figures of 14·7, 14·7, 14·2 and 12·9 per 1,000 for the corresponding halves of the years 1936 to 1933 respectively, the comparatively high level of 1935 being thus maintained both in 1936 and 1937 without alteration.

Deaths in England and Wales registered during the first two quarters of 1937 numbered 282,224, a figure 9,000 in excess of the corresponding figure of last year, which in its turn was more than 18,000 in excess of that of the previous year. In relation to the population exposed to risk, the number corresponds to a crude annual death rate of 13·8 per 1,000 and compares with 13·4, 12·6, 13·1 and 13·8 for the first halves of the years 1936 to 1933. Such abnormality as there may be in the latest record must be ascribed mainly to the influenza epidemic experienced throughout the whole of the country in the early months of the year. In late years the bulk of the variations in the years' deaths have arisen from fluctuations in the first quarter's figures, from which it may be expected that the incidence of deaths in 1937 as a whole will be above, rather than below, the average of recent years.

The recently issued Ministry of Transport Annual Returns of the capital, traffic, receipts and expenditure of Railway Companies in Great Britain reflect the general industrial improvement during 1936. Net revenue amounted to £36,527,499, an increase of £2,832,441 or 8·41 per cent. on the 1935 figure, the average return upon the total capital issued being 3·23 per cent., as compared with 3·05 per cent. in the previous year. Apart from the Ordinary stock of the London and North-Eastern Company, all classes of capital issued by the four principal Companies received some remuneration, certain junior stocks having benefited by their first payment since 1930. It should be pointed out, however, that relief has been afforded to revenue expenditure by credits of £2,401,000 in respect of recoverable over-payments of local rates and rate relief, consequent upon the substantially reduced valuations of the undertakings for the five years ended March 31, 1936, under the Railways (Valuation for Rating) Act of 1930. From the same source reserve and renewal funds were augmented by about £7,000,000.

Capital expenditure increased by £3,944,078, the outlay having reached £1,184,042,538. Additional rolling-stock and the provision of sidings and improved working facilities account for the major portion of the increase. Capital receipts at December 31 stood at £1,116,558,965, the excess of expenditure over receipts (met by internal investment of reserve funds, etc.) being £67,483,573.

Gross receipts from all services rose by £7,236,417 or 4·04 per cent. to £186,469,767, the purely railway services yielding £6,273,555 of the increase. To this, passenger traffic contributed £2,181,575 and goods and miscellaneous services £4,091,980, representing increases of 3·12 per cent. and 4·67 per cent. respectively. The number of passenger journeys was 2·11 per cent. higher at 1,257 million or about 10 million below the peak figure of 1929. Goods tonnage improved by 3·50 per cent. to 280,712,094, but was about 15 per cent. less than in 1929.

Revenue expenditure advanced by £3,878,104 to £152,182,845, railway working having cost £3,160,533 more or 2·48 per cent., and subsidiary services £717,571 or 3·32 per cent. The principal items calling for increased outlay were maintenance of way and works and rolling-stock, locomotive running and traffic expenses, an additional expenditure of £3,952,490 on these items having been offset by reduced local rates and contributions to the Freight Rebates Fund set up by the De-rating Act of 1929. Heavier business at the companies' docks and harbours yielded increased receipts of £197,348, with a relatively small additional expenditure of £16,585, thus increasing the net receipts by £180,763 to £679,042, whilst hotels and refreshment services, benefiting by the improved passenger traffics, produced a net revenue of £640,026, an increase of £51,797. The percentage of railway working expenditure to receipts fell by 1·17 to 79·62, the lowest figure since 1929.

There were 20,121 miles of railway open for traffic at December 31 and a stock of locomotives of 20,029, a decrease of 330. Passenger-carrying vehicles numbered 43,562, with an average seating capacity of 58·14, and railway-owned merchandise and mineral wagons increased by 1,993 to 635,946, with an average tonnage capacity of 11·83. The popularity of the "container" method of goods transport is evidenced by a further addition of 1,765 to the stock of containers, which stood at 13,034, or more than double the 1931 total.

The operating statistics show that the mileage worked by locomotives increased by about 3·0 per cent. to 584,796,000, the daily average per locomotive in use having increased by 1·47 to a record figure of 111·55. Steam locomotives consumed 52·79 lb. of coal per mile as compared with 52·42 lb. in 1935 and 6·7 pints of lubricating oil were required for every 100 miles worked. Coaching train-miles per train-hour (including stationary time) fell slightly to 14·98, and a decrease in the corresponding freight train figure of 0·45 to 8·86 is accounted for by heavier loading of the trains, the average net load having increased by 2·10 tons to 128·08. The net ton-mileage of freight traffic worked per engine-hour was 459·69, a slight decrease on the previous year.

Further progress is shown during the current year by Return No. 209 of the Ministry's "Railway Statistics," which gives the position up to April 30. For the four months, the number of passenger journeys (excluding those of season-ticket holders) was 264,505,000, and a further 139,786,000 journeys were undertaken on the lines of the London Passenger Transport Board. These figures represent increases of 1·5 per cent. and 1·6 per cent. respectively. Receipts from passengers rose by 2·8 per cent. to £12,590,023, and for the London Transport lines by 1·5 per cent. to £1,854,827. For the month of April substantial increases are shown in the receipts from first-class and workmen's fares. 83 per cent. of the revenue of the main-line companies was derived from fares lower than the standard, and the average receipts per journey were 2·17*d*. lower at 11·61*d*. Season tickets produced £898,053, an increase of 5·0 per cent., whilst parcels and miscellaneous traffic contributed £1,110,860 or 3·3 per cent. more than in April 1936.

In the 20 weeks ended May 15, 115,904,000 tons of freight were carried, an increase of 5,034,000 or 4·5 per cent., producing a revenue of £36,324,000 or 3·8 per cent. more than in the corresponding period of 1936.

Coaching-engine mileage during this period increased by 1·6 per cent. to 126,532,000 and freight-engine mileage by 2·9 per cent. to 101,696,000. Average train-miles per train-hour at 15·12 for coaching- and 8·53 for freight-trains were slightly lower than in 1936, probably owing to the greater traffic density, but the average net freight-train load rose by 2·22 to 132·14 tons. Net ton-miles per engine-hour increased from 457·92 to 462·85.

The Companies' returns of gross traffic receipts up to August 29 are as follows :—

Company.	Receipts.	Increase on 1936.	
	£	£	*Per cent.*
Great Western	18,084,000	876,000	5·09
L.M.S.	43,146,000	1,669,000	4·02
L.N.E....	31,493,000	1,458,000	4·85
Southern	14,443,000	493,000	3·54
Total	107,166,000	4,496,000	4·38

2. OTHER STATISTICS.

The advance in *shipping freights*, which has been practically continuous during the last twelve months, was arrested for a short time in June 1937, but in the month of July prices rose again and were nearly 66 per cent. higher than a year ago. Time-charter rates were still higher and in July were 200 per cent. in advance of those prevailing in July 1936. The index number of the Chamber of Shipping (1920 = 100) was in May 36·05, in June 33·95 and in July 34·26. As compared with 1929 freights in July 1937 showed an advance of 37¾ per cent.

The decline in *Stock Exchange Values* noted in Parts I and II of the *Journal* continued through June and July 1937 and the index number of prices of securities (Dec. 1931 = 100) prepared by the *Bankers' Magazine* was 125·1 at the middle of July, lower than at any time since October 1935, when it stood at 121·3. Since October 1936 there has been a fall of rather less than 7 per cent. The fall in Fixed Interest Stocks has been about 7¼ per cent. since that month, but the decline in the prices of Variable Dividend Securities did not commence until the end of January 1937, since when these securities have fallen slightly over 7 per cent. During June and July 1937 the only securities which have fairly consistently improved in price have been British Railway Preference and Ordinary Stocks. On the other hand, British Railway Debentures declined during both months and there was a marked falling off in the values of South African mining shares. The prices of iron, coal, steel and copper shares fell away in June, but fully regained their previous position during July. British and Foreign Government Stocks continue to be affected by the uncertain outlook in world affairs.

For the first six months of 1937 the statistics of *retail sales* prepared by the Bank of England in conjunction with various retail distributors' associations and cooperative societies showed an increase of 8·2 per cent. over the corresponding period in 1936. The sales of food and perishable goods were 9·5 per cent. greater and those of other merchandise 6·8 per cent. Among other merchandise the greatest advance was in boots and shoes, which showed increased sales of 10·9 per cent. over the first six months of 1936. It is probable that higher prices were largely responsible for the increases in value of the sales both of boots and shoes and of articles of food. According to the Ministry of Labour's index number retail food prices had advanced nearly 9 per cent. during the six months and boot and shoe prices nearly 6 per cent. compared with those obtaining in the first half-year of 1936.

A brochure lately received gives the particulars relating to a body whose title is rendered in English as the "Institute for the Research of Population Problems in Japan." The Institute was established in Tokyo in 1933 with the co-operation of the Japanese Government. For many years past there has existed an official Commission for the Investigation of Population and Food, and since 1928 some of the members and other persons had been pressing for the establishment of an auxiliary organ to carry out researches into the problems connected with population in order that accurate data and carefully considered conclusions might be available to those whose business it was to direct the policy of the country. The promoters also had in mind that the problem could not be resolved by internal measures alone, and one of the objects of the Institute is to serve as an organ of contact with world conferences on population and emigration. The brochure referred to, published this year, describes the aims, constitution, and activities of the Institute, and gives a list of its publications past and prospective.

A Report on the Population of Japan was submitted to the International Population Conference by Mr. Masaji Inouye, the Managing Director of the Institute. This is a careful statistical survey of the growth of the Japanese population since 1872, with an examination of the present trends and a consideration of future probabilities. A good deal of detail is given in its 27 pages. The movement of population is traced through the three periods of slow increase (1872–1900) of extremely rapid increase (1900–1920), and of slowed-down increase (since 1920), in which last period an actually declining birth-rate is masked by a great decrease in mortality—mainly infant mortality. Although the birth rate is following the same course as that of the western nations it is not considered that the fall will proceed as rapidly as theirs, owing to the social obstacles to the practice of birth-control which exist in Japan. Dr. Inouye estimates that in 1970 the population of Japan proper, now 69½ million, will have grown to about 95 million, and the task before the nation is to increase economic resources in proportion. Dr. Inouye shows the trends of the industrial and agricultural production in relation to that of the population movement, the age composition of the population; and the occupational distribution at the last two censuses. Industrialization and urbanization are still increasing, but agricultural production is declining in proportion to population, and can hardly be made to support more than the present numbers. Further industrialization is thus the only resource, and is obstructed by the lack of raw materials. The author ends by a plea for international co-operation in the solution of what he conceives to be an otherwise insoluble problem.

STATISTICAL AND ECONOMIC ARTICLES IN RECENT PERIODICALS.

UNITED KINGDOM—

Annals of Eugenics, June, 1937—Note on the development of correlations among genetic components of ability: *M. S. Bartlett*. Professor Karl Pearson and the method of moments: *R. A. Fisher*. A further note on the arrangement of variety trials; quasi-Latin squares: *F. Yates*. The comparison of variability in populations having unequal means. An example of the analysis of covariance with multiple dependent and independent variates: *B. Day* and *R. A. Fisher*. On a point raised by M. S. Bartlett on fiducial probability: *R. A. Fisher*. Summary of results of investigations into the height and weight of children of the British working classes during the last hundred years: *M. N. Karn*.

The Banker—

July, 1937—France: economic and financial condition. [Whole number.]

August, 1937—The gold question: *A. V. Barber*. Bankers and the gold problem: *P. Einzig*.

Bankers' Magazine—

July, 1937—The direct taxes: *A. H. Gibson*. The future of gold. The banking half-year.

August, 1937—The banking half-year.

Barclay's Bank Ltd. Monthly Review, July, 1937—Credit expansion and the employment of funds.

Biometrika, June, 1937—On the z-test in randomized blocks and Latin squares: *B. L. Welch*. Some aspects of the problem of randomization: *E. S. Pearson*. The distribution of the ratio of covariance estimates in two samples drawn from normal bivariate populations: *H. O. Hirschfeld*. The sampling distribution of the criterion λ_H when the hypothesis tested is not true—I. Note on the general sampling moments of λ_H: *S. S. Wilks*. II. An investigation into the adequacy of Dr. Wilks's curves: *C. M. Thompson*. The exact value of the moments of the distribution of χ^2, used as a test of goodness of fit, when expectations are small: *J. B. S. Haldane*. Tests of goodness of fit applied to records of Mendelian segregation in mice: *J. B. S. Haldane* and *H. Grüneberg*.

Chartered Surveyors' Institution, Journal, August, 1937—Hop and fruit growing industries in Kent: *T. Neame*.

UNITED KINGDOM—*Contd.*

Economic Journal, June, 1937—Some notes on the Stockholm theory of savings and investment, II: *B. Ohlin.* Alternative theories of the rate of interest: *J. M. Keynes.* Statics and dynamics in socialist economics: *A. P. Lerner.* The concentration of economic control in Japan: *G. C. Allen.* The problem of the Lancashire coal industry: *W. Prest.* Special obstacles to full employment in a wealthy community: *W. B. Reddaway.* National income at its climax: *Colin Clark.*

Economica, August, 1937—The changing structure of the family in Australia: *Enid Charles.* Some theoretical aspects of the gold problem: *T. Balogh.* The influx of labour into London and the South East, 1920–36: *Brinley Thomas.* The British Exchange Equalization Fund, 1935–37: *F. W. Paish.*

Eugenics Review, July, 1937—Future trends in population: *R. R. Kuczynski.*

Faculty of Actuaries, Transactions, Part IV, 1937—The gold standard and modern conditions: *W. G. Craig.*

Lloyds Bank Ltd. Monthly Review—

July, 1937—The economic outlook of Germany: *Alwyn Parker.*

August, 1937—The economic and financial situation in Austria: *H. Rizzi.*

Midland Bank Monthly Review, July-August, 1937—Movements in the floating debt. Their causes and implications.

Ministry of Agriculture, Journal, July, 1937—Crop husbandry in the 18th century: Bedford, Cambridge and Huntingdon: *G. E. Fussell.*

Review of Economic Studies, June, 1937—Fluctuations in housebuilding and the trade cycle: *Marian Bowley.* Marx and the trade cycle: *Henry Smith.* A general method for the comparison of the price of living: *H. Staehle.* A middle-class budget enquiry: *P. K. O'Brien.*

Sociological Review, July, 1937—The white population of the Empire: *R. R. Kuczynski.* Migration movements to and from the British Isles: *A. M. Carr-Saunders.* Differential fertility: *Enid Charles.* Economic consequences and problems: *H. D. Henderson.* Family allowances in relation to population problems: *E. M. Hubback.*

AUSTRALIA—

Economic Record, June, 1937—Edwin Cannan, the tribute of a friend: *C. R. Fay.* Some effects of the Australian tariff: *W. B. Reddaway.* Comparative costs in international trade: *E. R. Walker.* Size and efficiency in New Zealand industry: *G. C. Billing.*

UNION OF SOUTH AFRICA—

South African Journal of Economics, June, 1937—"The theory of gold supply"—discussion. 1. The incidence of the tax on gold mining in South Africa: *D. Black.* 2. Notes on "the theory of gold supply": *Sir Robert N. Kotzé.* 3. Reply to discussion: *W. J. Busschau.* The restriction of competition between road motor transport and the railways in the Union of South Africa: *R. Horwitz.* Urbanization, 1904–1936: *H. A. Shannon.*

UNITED STATES—

American Statistical Association, Journal, June, 1937—Industrial productivity and prices: *F. C. Mills.* Variations in price relative distributions, 1927 to 1936: *L. Ascher.* A graphic method of measuring seasonal variation: *W. A. Spurr.* The construction of two height charts: *M. A. Burgess.* Methods and problems of sampling presented by the urban study of consumer purchases: *E. H. Schoenberg* and *M. Parten.* Consistency of recording data from prison files: *B. S. Sanders.* The measurement of purchasing power: *E. E. Lewis.* Fiducial limits of the Poisson frequency distribution: *W. E. Ricker.*

Econometrica, July, 1937—Annual survey of economic theory: the recent controversy on the theory of capital: *N. Kaldor.* Annual survey of statistical technique: methods of computing and eliminating changing seasonal fluctuations: *H. Mendershausen.* Some investigations in the sampling and distribution of retail prices: *J. H. Cover.*

Harvard Business Review, Vol. XV, No. 4—The timing of capital production and the need for forecasting: *E. C. Bratt.* 100% bank reserves: *G. B. Robinson.* Economic aspects of recreation: *J. Weinberger.*

Journal of Political Economy, June, 1937—The general dynamics of money: *J. W. Angell.* The productivity of labour in Great Britain: *W. Bowden.*

Milbank Memorial Fund Quarterly, July, 1937—The significance of imminent population changes in the United States: *F. Lorimer.* Pregnancy wastage in New York City: *D. G. Wiehl* and *K. Berry.* Recent analyses of marriage rates: *C. V. Kiser.*

Monthly Labor Review, July, 1937—Productivity of labour and industry (four articles).

Quarterly Journal of Economics, August, 1937—The gold dilemma: *C. R. Whittlesey.* Is money saving equal to investment? *M. Curtis.* Population cycles as a cause of business cycles: *A. Lösch.* The economics of low-income diets: *H. L. Sorenson* and *E. W. Gilboy.*

Review of Economic Statistics, August, 1937—Interrelation of prices, output, savings, and investment: *W. W. Leontief.* Short-period variations in the distribution of incomes: *H. Staehle.* New indices of agricultural supplies and carry-over: *E. J. Working.*

BELGIUM—

Revue du Travail, Juin, 1937—Enquête organisée par le Service Médical du Travail au sujet de la silicose: *M. Langelez.* Projet de réforme de l'enseignement industriel. Ecoles industrielles pratiques: *E. Veuchet.*

CZECHOSLOVAKIA—

Revue Statistique Tchécoslovaque, Juin, 1937—Résultats de la statistique criminelle en 1931 considérés du point de vue anthropogéographique: *J. Auerhan.* Rythme hebdomadaire et cycle annuel des naissances: *A. Boháč.* Les migrations dans les grandes villes pendant la crise économique mondiale: *V. Sekera.*

DENMARK—

Nationaløkonomisk Tidsskrift, Hefte 3–4, 1937—Statistikens Anvendelse indenfor økonomisk-historisk Forskning: *E. F. Heckscher.* Driftsstatistiske Undersøgelser over Frugt-og Grønthandelen i København og Frederiksberg: *C. Lind.* Fortegnelse over et Udvalg af Professor Harald Westergaards Skrifter.

FRANCE—

Bulletin de la Statistique Générale de la France, Avril–Juin, 1937—Les provinciaux à Paris en 1931. (Répartition des recensés d'après leur lieu de naissance): *H. Bunle.*

Journal des Économistes, Mai-Juin, 1937—La crise de l'or: *E. Payen.* L'année 1936 dans l'économie polonaise (suite et fin): *C. de Kownacki.*

GERMANY—

Allgemeines Statistisches Archiv, Heft 1, 1937—Menge-Wert-Volumen. Zur Deutung der Aussenhandelsstatistik: *W. Grävell.* Die Altersgliederung des männlichen Zweiges der souveränen Geschlechter Ende 1935: *F. Savorgnan.* Die Religion in den Volkszählungen des In- und Auslandes: *J. Buck.* Der Untergang der alten Kulturvölker. Eine Statistik in Worten: *R. Korherr.* Statistik, Enquête oder direkte Erhebung?: *H. Fröhlich.*

Archiv für Mathematische Wirtschafts- und Sozialforschung, Heft 2, 1937—Einige Grundfragen der mathematischen Konjunkturtheorie (II): *J. Tinbergen.* Wirtschaft und Mathematik: *P. Riebesell.* Der mittlere Fehler und seine graphische Darstellung: *O. Steiner.*

Die Bank, Juni, 1937—Die Bedeutung der internationalen Handelskammer für die weltwirtschaftliche Entwicklung: *O. C. Fischer.* Betrachtungen zur internationalen Währungslage: *E. Hülse.* Voraussetzungen weltwirtschaftlicher Zussamenarbeit: *Carl Lüer.* Grundsätzliche Fragen der deutschen Handelspolitik: *Ernst Posse.*

GERMANY—*Contd.*

Blätter für Versicherungs-Mathematik, Juli, 1937—Invalidität und Sterblichkeit: *H. Klingler.*

Vierteljahrshefte zur Wirtschaftsforschung, Juli, 1937—Grundsätze der Preispolitik: *E. Wagemann.* Einfluss der Preise auf die Produktion in der Landwirtschaft: *A. Vogel* and *C. Boehm.* Die Bewegung des industriellen Preisspiegels und die Industrieproduktion: *R. Wagenführ.*

Weltwirtschaftliches Archiv, Juli, 1937—A series of articles on Japan, including: Die wirtschaftsrechtliche Struktur als Grundlage des japanischen Wirtschaftsaufschwungs: *M. Royama.* Bevölkerungsfrage und Wirtschaft im gegenwärtigen Japan: *T. Uyeda.* Aufbau der Industriewirtschaft und technischer Fortschritt in Japan: *S. Shiomi.* Kreditverfassung und Kreditpolitik im japanischen Industrialisierungsprozess: *M. Araki.*

Zeitschrift für die gesamte Versicherungs-Wissenschaft, Juli, 1937—Der Einfluss des Versicherungsfalls auf die Versicherungssumme: *W. Kisch.* See- und Binnenversicherung: *O. Hagen.*

ITALY—

Le Assicurazioni Sociali, Maggio-Giugno, 1937—Assistenza malattia ai lavoratori dell' industria: *N. Bonfatti.* La mortalità per tubercolosi in Italia nel periodo dal 1925 al 1935: *G. Mikelli.*

Giornale degli Economisti e Rivista di Statistica—

Giugno, 1937—Aspetti probabili della capitalizzazione coloniale: *G. Demaria.* L'attuale organizzazione monetaria della Germania: *G. Mancini.* Su alcuni orientamenti critici delle teorie economiche odierne: *A. Gambino.*

Luglio, 1937—Per la teoria degli odierni pagamenti internazionali: *G. Del Vecchio.*

Rivista di Storia Economica, Giugno, 1937—Il bilancio dello stato italiano della unificazione ad oggi (1862–1931–35): *F. A. Répaci.* La teoria dell' astinenza in Senior: *M. Lamberti.*

POLAND—

Baltic and Scandinavian Countries, May, 1937—The vital statistics of Poland, 1895–1935: *S. Szulc.* Unemployment policy and business revival in Sweden and Finland: *A. Montgomery.* Is Swedish industrial prosperity unstable?: *Brinley Thomas.* The foreign trade of the Baltic countries in 1935: *B. Polkowski.*

SWEDEN—

Skandinaviska Kreditaktiebolaget, July, 1937—The equilibrium of the capital market: *G. Cassel.* Sweden's national income: *E. Lindahl.*

SWITZERLAND—

Zeitschrift für schweizerische Statistik und Volkswirtschaft, II, 1937—Zwei Abwertungen: *M. Saitzew.* Neugestaltung der Handelspolitik: *A. Amonn.* Le problème de la prévision en économique rationnelle: *C. Jaeger.*

INTERNATIONAL—

International Labour Review—

June, 1937—Public works in the United States of America: *H. Ickes.*

July, 1937—A year of "experiment" in France: I: *F. Maurette.* New trends in social policy in Germany: *L. H. A. Geck.*

International Review of Agriculture—

June, 1937—The social income for the year 1932–33, and the changes in it between 1931–32 and 1932–33, for predominantly arable farms in certain European countries: Soissonnais (France), Overijssel (Netherlands), Germany, Sweden, Switzerland, Austria, Hungary, Romania: *J. Deslarzes.*

July, 1937—International organization on the tea market: *F. Arcoleo.* The Canadian Royal Commission on Price Spreads: *A. Emanuel.*

Revue de l'Institut International de Statistique, Livr. 2, 1937—Une question importante pour la science des constitutions et pour la médecine militaire: comment juger si les proportions d'un individu sont normales? (avec résumé anglais): *C. Gini.* Das Problem der Willensfreiheit in der Statistik (avec résumé français et anglais): *W. Winkler.*

LIST OF ADDITIONS TO THE LIBRARY.

Since the issue of Part III, 1937, the Society has received the publications enumerated below :—

I.—OFFICIAL PUBLICATIONS.

(a) United Kingdom.

Art and Industry, Council for. The working class home : its furnishing and equipment. London : H.M.S.O., 1937. 9¾″ × 6″. 65 pp. + 12 pp. illustrations.

General Register Office—

Census of England and Wales, 1931. Counties of London and Middlesex (Part II). 13″ × 8¼″. 23 pp. 1*s*. 3*d*.

Story of the General Register Office and its origins from 1538 to 1937. 9¾″ × 6″. 22 pp. 4 plates. 6*d*. [London : H.M.S.O., 1937.]

Health, Ministry of. Report by the Government Actuary on the fourth valuation of the assets and liabilities of approved societies. London : H.M.S.O., 1937. 9¾″ × 6″. 111 pp. 2*s*.

Home Office—

Memorandum on the Truck Acts. 14 pp. 3*d*.

Report of the Departmental Committee on Courts of Summary Jurisdiction in the Metropolitan Area. 49 pp. 9*d*.

[London : H.M.S.O., 1937. 9¾″ × 6″.]

Labour, Ministry of. Statistics Branch. Local unemployment index. New series. No. 1, January 1937, to date. London : H.M.S.O., 1937. 13″ × 8″. Annual sub. 66*s*.

Medical Research Council. Special report series 222. The development of cardiac enlargement in disease of the heart : a radiological study. London : H.M.S.O., 1937. 9¾″ × 6″. 49 pp. 1*s*.

Meteorological Office. Professional notes, No. 77. Variations of temperature at Oxford, 1815–1934. By *Lilian F. Lewis.* London : H.M.S.O., 1937. 9¾″ × 6″. 12 pp. 3*d*.

Overseas Trade Department of—

Reports : 670. Poland, March 1937. 47 pp. 1*s*. 671. Bulgaria, 1935–36. 48 pp. 1*s*. 672. Malaya, March 1937. 51 pp. 1*s*. 673. Siam, April 1937. 48 pp. 1*s*. 674. Sweden, April 1937. 83 pp. 1*s*. 6*d*. 675. Greece, April 1937. 87 pp. 1*s*. 6*d*. London : H.M.S.O., 1937. 9¾″ × 6″. 5 parts.

Trade, Board of—

Census of seamen, June 15, 1936. (Vessels registered in the United Kingdom.) 13¼″ × 8¼″. 24 pp. 1*s*. 3*d*.

Report of the Committee on Compulsory Insurance. 9¾″ × 6″. 82 pp. 1*s*. 3*d*. [London : H.M.S.O., 1937.]

Transport, Ministry of. Electricity distribution : outline of proposals. London : H.M.S.O., 1937. 13¼″ × 8¼″. 24 pp. 1*s*.

(b) Dominions, Colonies, and Protectorates.

Canada—

Dominion Bureau of Statistics. Seventh census of Canada, 1931. Vol. VIII. Agriculture. Ottawa, 1936. 9¾″ × 6½″. ccxxii + 838 pp. $1.

Irish Free State—

Industry and Commerce, Department of. Census of industrial production. Report on production in certain industries in Saorstat Eireann in each of the years 1932 to 1935. Dublin : Stationery Office, 1937. 10″ × 6¾″. vi + 85 pp. 1*s*. 6*d*.

(c) **Foreign Countries.**

Belgium—

Office Central de Statistique. Population, recensement général au 31 décembre 1930. Tome III. Brussels, 1937. 12½" × 9½". 239 pp.

Estonia—

Bureau Central de Statistique. Estonie en chiffres : *résumé rétrospectif de* 1920–1935. Tallinn, 1937. 10¼" × 7¼". xvi + 348 pp. *Kr.* 6.

Germany—

Statistisches Reichsamt—

Ausschutz zur Untersuchung der Erzeugungs- und Absatzbedingungen der deutschen Wirtschaft.

Der deutsche Aussenhandel (Spezialhandel) im Jahre 1925 verglichen mit dem Jahre 1913 nach Waren und Ländern. . . .

[Berlin : Mittler, 1927. 13½" × 10½". 2 vols. (From Mr. J. Menken.)]

Italy—

Istituto Centrale di Statistica. VIII censimento generale della popolazione 21 aprile 1936. Vol. II. Province. Fas. 1–3, 10, 11, 13, 15–17, 23–70, 72–91, 94. Rome, 1937. 12" × 9". 83 parts. *L.* 4 each.

Japan—

Bureau of Social Affairs—

Institute for the Research of Population Problems in Japan : history, constitutions and activities. 15 pp.

Population of Japan : report submitted to the International Population Conference by *Masaji Inouye* . . . 27 pp. [Tokyo, 1937. 8¾" × 6".]

Luxembourg—

Office de Statistique. Publication Fasc. 70. Résultats du recensement de la population du 31 décembre 1935. Tome II. Luxembourg, 1937. 9½" × 6¼". 129 pp.

Switzerland—

Eidgenössische Dividentenstatistik 1933–1935. (Beiträge zur schweizerischen Statistik, Heft 6.) 9½" × 6¾". 87 pp.

(d) **International.**

International Labour Office—

Studies and reports, Series M. No. 14. The evaluation of permanent incapacity for work in social insurance. Geneva (London : P. S. King), 1937. 9½" × 6¼". xvi + 375 pp. 10*s*. 6*d*.

League of Nations—

Economic and Financial Section—

Money and banking 1936–37. Vol. I. Monetary review. 170 pp. Vol. II. Commercial banks. 174 pp. Geneva (London : Allen and Unwin), 1937. 10½" × 8¼". 2 vols. 6*s*. each.

Review of world trade 1936. Geneva (London : Allen and Unwin), 1937, 10½" × 8¼". 91 pp. 2*s*. 6*d*.

II.—AUTHORS AND MISCELLANEOUS.

Bartlett (*M. S.*). Note on the development of correlation among genetic components of ability. London : reprint from *Annals of Eugenics*, Vol. VII, Part IV. Pp. 299–302. 1937. 10¾" × 7¾".

—— Properties of sufficiency and statistical tests. London : reprint from *Proceedings of the Royal Society*, Series A. No. 901. Pp. 268–282. May 1937. 10" × 7".

Bartlett (*M. S.*). The statistical conception of mental factors. Reprint from *British Journal of Psychology* (General Section) July 1937. Pp. 96–104. 10¼″ × 7″. [From the author.]

Birmingham Information Service on Slavonic Countries—Poland. Monograph No. 4. The national income of Poland. Birmingham: the University, 1937. 10¼″ × 8½″. 16 pp.

Dalmuder (*J. J. J.*). On econometrics: some suggestions concerning the method of econometrics and its application to studies regarding the influence of rationalization on employment in the U.S.A. (Netherlands Economic Institute, publication No. 19.) Haarlem: De Erven F. Bohn, 1937. 9½″ × 6¼″. 88 pp. *F.* 1·50 (paper), *F.* 2·50 (bound).

Day (*B.*) and *Fisher* (*R. A.*). The comparison of variability in populations having unequal means: an example of the analysis of covariance with multiple dependent and independent variates. London: from *Annals of Eugenics*, Vol. VII, Part IV. Pp. 333–348, 1937. 10¾″ × 7¼″.

Emmison (*F. G.*). Types of open-field parishes in the Midlands. (Historical Association pamphlet No. 108.) London: G. Bell, 1937. 8½″ × 5½″. 15 pp. + 3 maps.

Fisher (*R. A.*). On a point raised by M. S. Bartlett on fiducial probability. London: reprint from *Annals of Eugenics*, Vol. VII, Part IV. Pp. 370–375. 1937. 10¾″ × 7¾″.

—— Professor Karl Pearson and the method of moments. London: reprint from *Annals of Eugenics*, Vol. VII, Part IV. Pp. 303–318, 1937. 10¾″ × 7¾″.

—— The wave of advance of advantageous genes. London: reprint from *Annals of Eugenics*, Vol. VII, Part IV. Pp. 355–369. 1937. 10¾″ × 7¾″.

Flux (*Sir Alfred W.*). Co-operative credit in Denmark. London: reprint. from the *Building Societies Gazette*, Sept. and Dec. 1935, and Jan. and Feb. 1936. 8½″ × 5½″. 22 pp. [From the author.]

Gloden (*A.*). Les précipitations au Grand-Duché de Luxembourg avec une carte pluviométrique. Recherche des coefficients de corrélation entre le rendement de la pomme de terre et la hauteur d'eau mensuelle au Grand-Duché de Luxembourg. Luxembourg: l'Office de Statistique. Reprint from *Bulletin Trimestriel*, No. 17. 11½″ × 9″. 7 pp. [From the author.]

Graham (*Frank D.*). Die Stabilisierung der wirtschaftlichen Entwicklung. (Kieler Vorträge . . . 47.) Jena: Gustav Fischer, 1937, 9½″ × 6½″. 23 pp.

Jordan (*Charles*). On approximation and on test criteria by the χ test and by Bayes' theorem. Budapest: reprint from *Journal de la Société Hongroise de Statistique*, No. 1–2, 1937. Pp. 101–128. 9″ × 6″.

—— Sur l'approximation d'une fonction à plusieurs variables. Reprint from *Acta Litterarum ac Scientiarum Regiae Universitatis Hungaricae Francisco-Josephinae.* Tome VIII. Fasc. IV. Pp. 205–225. 9½″ × 6¾″. [From the author.]

Koopmans (*T.*). Linear regression analysis of economic time series. (Netherlands Economic Institute, publication, no. 20.) Haarlem: De Erven F. Bohn, 1937. 9½″ × 6¼″. xii + 150 pp. *F.* 2 (paper), *F.* 3 (bound).

Lewis-Fanning (*E.*). A study of the trend of mortality rates in urban communities of England and Wales with special reference to depressed areas. London: reprint from *British Medical Journal*, April 24, 1937. 8½″ × 5½″. 9 pp. [From the author.]

McGregor (*A. C.*). The economic reforms required for lasting prosperity and peace: an address before the Economic Reform Club, 30th June, 1937. London: Economic Reform Club, 1937. 8½″ × 5½″. 42 pp. 9*d.*

Maclaurin (*William Rupert*). Economic planning in Australia, 1929–1936. London: P. S. King, 1937. 8½″ × 5½″. xv + 304 pp. 15*s.*

Neurdenburg (*M. G.*). De Begrootingspositie der Volksgezondheid 1937. 3 pp.

—— De groote daling van de jeugd-sterfte 1936. 6 pp.

—— Kanker en Ziekenhuisverpleging (in *Tijdschrift voor Sociale Geneeskund*, No. 193, 1936). 8 pp.

—— Zuigelingenbescherming nog steeds noodzakelijk. 17 pp. 1937. [Amsterdam. 11¾″ × 9″. (From the author.)]

Rose (*T. G.*). Business charts: a clear explanation of the various charts used in business, and of the principles governing the correct presentation of facts by graphic methods. 3rd ed. London: Pitman, 1937. 8¼″ × 5½″. xv + 100 pp. 7*s.* 6*d.*

Sheppard (*W. F.*). On the relations between Bernoulli's and Euler's numbers. Extract from *Quarterly Journal of Mathematics*, No. 117, 1889. 8¾″ × 5½″.

—— New tables of the probability integral. Reprint from *Biometrika*, Vol. II, Part II, pp. 174–190, Feb. 1903. 10¼″ × 7½″.

—— The calculation of moments of a frequency distribution. Reprint from *Biometrika*, Vol. V, Part 4, pp. 450–459, June 1907. 10¼″ × 7½″.

—— On the accuracy of interpolation by finite differences. Extract from *London Mathematical Society Proceedings*, Ser. 2, Vol. 4, pp. 320–341, 1906. 10¾″ × 7¼″.

—— Factorial moments in terms of sums or differences. Extract from *London Mathematical Society Proceedings*, Ser. 2, Vol. 13, pp. 81–96, 1913, 10¾″ × 7¼″.

—— Fitting of polynomial by method of least squares (solutions in terms of differences or sums). Extract from *London Mathematical Society Proceedings*, Ser. 2, Vol. 13, pp. 97–108, 1913. 10¾″ × 7¼″.

—— Extended meaning of conjugate sets. Extract from *London Mathematical Society Proceedings*, Ser. 2, Vol. 20, Part 3, pp. 222–224, 1921. 10½″ × 7½″.

—— Reciprocal correspondence of differences and sums. Extract from *London Mathematical Society Proceedings*, Ser. 2, Vol. 21, pp. 291–305, 1921. 10¾″ × 7″.

—— Calculation of moments of an abrupt frequency-distribution. International Congress of Mathematicians, Cambridge, August 1912. 10″ × 7″. 13 pp.

—— Reduction of error by means of negligible differences. International Congress of Mathematicians, Cambridge, August 1912. 10″ × 7″. 37 pp.

—— Interpolation with least mean square of error. International Mathematical Congress, Toronto, Canada, 1924. Pp. 821–830. 11¾″ × 8¾″.

—— Extension of accuracy of mathematical tables by improvement of differences. Reprint from *Napier Tercentenary Memorial volume, Royal Society of Edinburgh*, 1915. Pp. 343–361. 9¾″ × 7½″.
[From Professor R. A. Fisher.]

Smith (*Henry*). Retail distribution; a critical analysis. London: Oxford University Press, 1937. 8½″ × 5½″. vi + 178 pp. 7*s*. 6*d*.

Société financière de Transports et d'Entreprises Industrielles (Sofina). Annual report of the Board of Directors. Report of the Board of Supervisors. 3rd financial year 1931. 4th financial year 1932. Brussels, 1932–33. 11″ × 8¾″. 2 vols. English ed. (From Mr. Macrosty.)

Sofia, State University of. Publications of the Statistical Institute for Economic Research. No. 1, 1937. 133 pp. $1·25. No. 2, 1937. (The national income of Bulgaria, 1924–1935, By *A. S. Tchakaloff*.) 128 pp. $1·50. Sofia, 1937. 11″ × 8″. 2 vols.

Tippett (*L. H. C.*). The methods of statistics: an introduction mainly for experimentalists. 2nd ed. revised and enlarged. London: Williams and Norgate, 1937. 8½″ × 5½″. 280 pp. 15*s*.

Torngren (*Ralf*). Finska Pappersföreningen 1892–1918. Helsingfors, 1937. 11″ × 8″. 216 pp. [From the Finnish Paper Mills Association.]

Unwin (*A. Harold*). The rationalization and conservation of the timber resources of the world: mainly with reference to the amelioration of the "special areas" in the woodcraft, wood working trades, timber producing and timber using industry of Great Britain and everywhere. London: the Technical Press, 1937. 8½″ × 5½″. 48 pp. 2*s*. 6*d*.

Valaoras (*Vasilios G.*). A comparative study of the mortality of the population of Greece. Baltimore, Maryland: reprint from *Human Biology*, Dec. 1936. Pp. 553–564. 9½″ × 6″. [From Dr. Lowell J. Reed.]

Watson (*J.*). The groundwork of economic theory. London: P. S. King, 1937. 8½″ × 5½″. x + 196 pp. 9*s*.

Wilks (*S. S.*). Lectures . . . on the theory of statistical inference 1936–1937. Princeton University, Department of Mathematics, 1937. 10¾″ × 8½″. 106 pp. $1·60.

Willsmore (*A. W.*). Business budgets and budgetary control. 2nd ed. London: Pitman, 1936. 8½″ × 5½″. xiii + 241 pp. 10*s*. 6*d*.

Wilmot (*John*). Labour's way to control banking and finance. London: Methuen, 1935. 7¼″ × 4½″. vii + 119 pp. 2*s*. 6*d*.

Worcester State Hospital, Worcester, Mass. Memorial foundation for neuroendocrine research and research service of the . . . hospital. Biometric bulletin. Vol. I, No. 1, June 1936; No. 2, Dec. 1936. Worcester, Mass., 1936. 8¾" × 6". 2 parts. $2 *per annum.*

Wyatt (*T. W.*). Money and the machine age. London: P. S. King, 1937. 7¼" × 4¾". 120 pp. 2*s.* 6*d.*

Zizek (*Franz*). Wie statistische Zahlen entstehen. Die entscheidenden methodischen Vorgange. Leipzig: Hans Buske, 1937. 9¼" × 6". iii + 151 pp. *Rm.* 4·50.

Zuckermann (*S.*). Deutschlands chemische Industrie auf dem Weltmarkt in graphischer Darstellung, 1933–1936. 24 pp. *Rm.* 12.

—— Deutschlands Elektro-Industrie auf dem Weltmarkt in graphischer Darstellung, 1933–1936. 24 pp. *Rm.* 10.

—— Der Wettbewerb in Sudost-Europa in graphischer Darstellung, 1928–1936. 22 pp. *Rm.* 10.

—— Bulgariens Aussenhandel in graphischer Darstellung, 1909–13 und 1921–1935. 20 pp. *Rm.* 10.

—— Frankreichs Aussenhandel in graphischer Darstellung, 1909–13 und 1925–1935. 40 pp. *Rm.* 36.

—— Sowjetrusslands Aussenhandel in graphischer Darstellung, 1928–1935. 27 pp. *Rm.* 17. [Berlin, 1936–37. 11¼" × 8¼".]

PERIODICALS RECEIVED BY THE LIBRARY.

ANNUAL LIST.

In addition to the publications named in the bi-monthly lists, the Society receives the official and other periodicals enumerated below.

(a) United Kingdom and its several Divisions.

National.

United Kingdom—

Admiralty. Health of the Navy. Fleets. Navy appropriation account. Navy Dockyard accounts.

Agriculture and Fisheries, Ministry of. Agricultural market report. Agricultural marketing schemes report. Economic Series Reports. Journal of the Ministry of Agriculture. Agricultural statistics. Diseases of animals, Report. Land Division, Report. Salmon and freshwater fisheries Report. Sea fisheries: Report; Statistical tables.

Air Ministry. Appropriation account. Health of the Royal Air Force. Progress of civil aviation.

Charity Commission. Report.

Civil Service Commission. Annual report.

Colonial Office. Annual Colonial reports. Economic survey of the Colonia Empire.

Control, Board of. Lunacy and mental deficiency.

Crown Lands, Office of Commissioners of. Report.

Customs and Excise, Commissioners of. Report.

Development Commission. Report.

Dominions Office. Report of Overseas Settlement Committee.

Ecclesiastical Commission. Report.

Education, Board of. Report and statistics. Health of the school child. Memorandum on Board of Education estimates.

Electricity Commission. Annual report. Engineering and financial statistics. Generation of electricity.

Foreign Office. Suez Canal; Annual return of shipping and tonnage.

Forestry Commission. Annual report.

Friendly Societies, Registry of. Reports of the Chief Registrar. Industrial Assurance Commissioner, Report.

General Register Office. Weekly return of births and deaths. Quarterly return of births, deaths and marriages. Registrar-General's statistical review.

Health, Ministry of. Accounts of the National Health Insurance Fund. Alkali works, report. Annual report. Costing returns. Local taxation returns. Poor relief, quarterly statement. Rates and rateable values in E. & W. State of the public health. Welfare of the blind, Report.

Home Office. Aliens Restriction Acts, statistics. Criminal statistics. Report of Chief Inspector of Factories and Workshops. Licensing statistics. Police (Counties and Boroughs), reports of H.M. Inspector; Report of the Commissioner of Police for the Metropolis. Prisons and convict prisons. Race-course Betting Control Board report. Road accidents involving personal injury. Workmen's compensation statistics.

Imperial Economic Committee. Supplies of canned and dried fruit. Dairy produce supplies. Fruit supplies. Wool production and trade.

Imperial Institute. Mineral industry of the British Empire and foreign countries statistical summary.

India Office. Statistical abstract for British India. Home accounts. Progress and condition of India.

(a) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

Inland Revenue, Board of. Report of Commissioners.

Labour, Ministry of. Abstract of labour statistics. Annual report of the Ministry of Labour. Juvenile employment (London) reports. Local unemployment index. Ministry of Labour Gazette.

Lord Chancellor's Department. Civil judicial statistics.

Medical Research Council. Annual report. Industrial Health Research Board, annual report; Special report series.

Meteorological Office. Annual Report of the Director. Monthly weather report annual summary.

Mines Department. Annual report of Secretary for Mines. Deaths from accidents in mines. Electrical Inspector of Mines, report. List of mines. Miners' welfare fund, report. Safety in Mines Research Board, report.

Mint, Royal. Annual report of the Deputy Master and Comptroller.

National Debt Commissioners. Local loans fund, accounts, National Health insurance fund and Unemployment insurance fund, account of securities held. Post Office savings banks, accounts. Savings banks and friendly societies, annual account, Trustee savings banks, annual report of the Inspection Committee.

National Insurance Audit Department. Report.

Overseas Trade, Department of. Reports by H.M. Trade Commissioners.

Patent Office. Report of the Comptroller-General.

Pensions, Ministry of. Annual report.

Permanent Consultative Committee on Official Statistics. Guide to current official statistics.

Post Office. P.O. Commercial accounts. British Broadcasting Corporation annual report.

Public Trustee Office. General report.

Public Works Loan Board. Annual report.

Queen Anne's Bounty Office. Annual report.

Scientific and Industrial Research, Department of. Annual report. Forests Products Research Board, report. Fuel Research Board, report.

Trade, Board of. Accounts relating to trade and navigation [Monthly]. Annual statement of trade. Bankruptcy. Board of Trade journal. Companies. Controller of the Clearing Office, report. Foreign trade and commerce [Quarterly]. Gas undertakings. Navigation and shipping. Pilotage return. Shipping casualties and deaths on vessels. Statistical abstract for the British Empire. Statistical abstract for the United Kingdom. Survey of industrial development. Weights and measures.

Transport, Ministry of. London and Home Counties Traffic Advisory Committee, annual report. Railway accidents. Railway companies (staff) return. Railway returns. Road Fund, report on administration of. Railway Rates Tribunal, annual report. Tramways and light railways (street and road) and trolley vehicle undertakings return of road accidents.

Treasury. Appropriation accounts: Civil service, Revenue departments. Civil service, estimates. Consolidated fund, abstract account. Finance accounts. Financial statement. National debt return. National Radium Trust and Radium Commission, Annual report. Public Departments, gross and net cost. Public social services, return of expenditure. Public income and expenditure. Trading accounts and balance sheets. University Grants Committee, report.

War Office. Army appropriation account. General annual report of the British Army. Health of the Army. Territorial Army finances. War Office Library, Annual supplement to subject index.

Municipal and other local returns.

LONDON COUNTY COUNCIL: Annual report; L.C.C. gazette; London statistics; Statistical abstract.

METROPOLITAN BOROUGHS. Accounts: Battersea, Islington. Medical Officer of Health, Report: Paddington.

(a) United Kingdom and its several Divisions—*Contd.*

United Kingdom—*Contd.*

MUNICIPAL BOROUGHS. Accounts: Birmingham, Carlisle, Chester, Ipswich, Leicester, Liverpool, Manchester, Nottingham, Southgate. Medical Officer of Health, Reports: Birmingham, Liverpool, Manchester, Wolverhampton.

Scotland—

Agriculture, Department of. Annual report. Agricultural statistics. Preliminary returns—Acreage. Produce of crops.
Control, General Board of. Annual report.
Education Department, Scottish. Annual reports, combined volume.
Fishery Board for Scotland. Annual report. Statistical tables.
Health, Department of. Annual report. Central Midwives Board, report. Report on incapacitating sickness in the insured population.
Prisons Department. Annual report. Civil judicial statistics. Criminal statistics.
Registrar-General. Annual report. Births, deaths and marriages: Weekly, Monthly, and Quarterly returns.
Scottish Office. Constabulary, Report of H.M. Inspector. Local taxation returns.
ABERDEEN. Report of the Medical Officer of Health.
EDINBURGH. Municipal Accounts.
GLASGOW. Report of the Medical Officer of Health.

Northern Ireland—

Commerce, Ministry of. Electricity Supply Acts, annual report. Industrial Assurance Commissioner, annual report.
Education, Ministry of. Report.
Finance, Ministry of. Registrar-General's review of vital statistics. Quarterly return of births, deaths, and marriages. Ulster Year-book.
Home Affairs, Ministry of. Local taxation returns.

Miscellaneous Publications.

Accountant. Accountants' magazine. Agricultural Economics Society, journal of proceedings. Alliance news. Anglo-Swedish review. Annals of eugenics. Auctioneers' and Estate Agents' Institute, Journal.

Banking almanack. Banker. Bankers' magazine. Bank of England, Statistical summary. Barclays Bank monthly review. Barclays Bank (Dominion and Overseas) Monthly trade cables. Biometrika. Brewers' almanack and wine and spirit trade journal. British Association, Report of the Annual Meeting. British Iron and Steel Federation: Statistical bulletin [Monthly], Statistics [Annual]. British Library of Political and Economic Science Monthly list. British Waterworks Association, Official circular. Broomhall's corn trade year-book. Building industries survey. Building societies year-book.

Chamber of Commerce journal. Chamber of Shipping, Annual report. Chartered Institute of Secretaries, Proceedings, etc. Chartered Surveyors' Institution, Journal, List of Fellows. Colliery guardian. Commercial world. Co-operative Congress, Annual report. Corporate accountant. Corporation of Foreign Bondholders, report.

Daily Herald monthly new capital digest. Daily Mail year-book. Dalgety and Co., Annual review.

East India Association Journal. Economica. Economic journal. Economist. Eugenics review.

Faculty of Actuaries, Transactions. Financial review of reviews. Fireman.

Geographical journal.

Health and empire. Horse owners reference book. Hospitals year-book.

(a) United Kingdom and its several Divisions—*Contd.*

Miscellaneous Publications—Contd.

Incorp. Society of Rating and Valuation Officers, Journal. Institute of Actuaries, Journal, Year-book. Institute of Actuaries Students' Society, Journal. Institute of Bankers, Journal. Institute of Chartered Accountants, List of Members. Institution of Civil Engineers, Journal, List of Members. International cotton bulletin. Iron and Steel Institute, Journal.

Jacks (W. & Co.) trade barometer.

King Edward's Hospital Fund: Annual report, Statistical summary.

Land and liberty. Light and lighting. Liverpool Cotton Association, Annual and weekly circulars. Lloyds Bank monthly review. Lloyd's Register: Annual Report, Shipbuilding returns, Wreck returns. London and Cambridge Economic Service: Monthly bulletin, and Special memoranda. London Bankers' Clearing House, Annual statement.

Mallett's weekly wool chart. Manchester guardian commercial; Manchester Statistical Society, Transactions. Mersey Docks and Harbour Board, Annual report. Metropolitan Water Board, Annual report. Midland Bank monthly review. Mining Association of Great Britain Statistical review of the coal industry. Municipal year-book.

National Association for Prevention of Tuberculosis: Transactions, Report of Council. National temperance. Nature.

Peabody Donation Fund, Report of Governors. People's year-book. Pixley and Abell's circular. Planning. Population. Post magazine: Post magazine almanack. Public administration, Journal of. Public health. Publishers' circular.

Quarterly journal of mathematics. Quin's metal handbook and statistics.

Registered accountant. Review of base metal conditions. Review of economic studies. Rothamsted Experimental Station: Annual report. Royal Agricultural Society of England, Journal. Royal College of Physicians of London, List of Fellows, etc. Royal College of Surgeons of England, Calendar. Royal Institution, Proceedings. Royal Meteorological Society, Journal and Phenological Report. Royal Sanitary Institute, Journal. Royal Society of Arts, Journal. Royal Society of Edinburgh, Proceedings, Transactions.

Samuel Montagu & Co., Weekly letter, Annual bullion letter. Scottish Chartered Accountants, Official directory. Secretary. Secretaries' Association, Year-book. Seyd (R.E.), Statistics of failures. Signal. Society of Motor Manufacturers: The Motor industry of Great Britain. Society of Incorporated Accountants and Auditors, Year-book. Sociological review. South Wales coal annual. Statesman's year-book. Statist. Stock exchange gazette. Stock exchange year-book.

Tattersall's cotton trade review [Annual]. Times. Times literary supplement. Times trade and engineering supplement. Tin. Tropical agriculture.

United empire. University Calendars: University of London; University College, London; Manchester University; University College of Wales; Queen's University, Belfast.

Vacher's parliamentary companion.

Wallis' index cotton circular. Weddel & Co., Annual review of imported dairy produce. Westminster Bank review. Whitaker's almanack. Willing's press guide. Who's who.

Year-book of scientific and learned societies.

(b) India, Dominions, and Protectorates.

India—

Department of Commercial Intelligence and Statistics. Agricultural statistics. Indian coal statistics. Monthly statistics of cotton spinning and weaving. Monthly statistics of production in certain selected industries. Review of the trade of India. Sea-borne trade, Annual statement of. Sea-borne trade and navigation. [Monthly.] Sea-borne trade and navigation for

(b) **India, Dominions, and Protectorates**—*Contd.*

India—*Contd.*

the calendar year. Statistical abstract for British India. Statistical table relating to banks. Trade at stations adjacent to the land frontier routes.

Department of Industries and Labour. Annual report of Chief Inspector of Mines.

Meteorological Office. Memoirs. Scientific notes.

ASSAM. Administration report.

BENGAL. Administration report. Report on maritime trade.

BOMBAY. Labour gazette.

PUNJAB. Memoirs of the Irrigation Research Institute. Public health report.

Annual report of the Indian Chamber of Commerce.

Indian accountant.

Indian journal of economics.

Punjab Board of Economic Enquiry, Publications.

Sankhyā, Indian journal of statistics.

Irish Free State—

Currency Commission. Quarterly statistical bulletin.

Department of Agriculture. Journal.

Department of Industry and Commerce. Irish trade journal. Statistical abstract. Trade and shipping statistics [Annual]. Trade statistics [Monthly].

Department of Local Government and Public Health. Annual report of the Registrar-General. Quarterly return of the marriages, births and deaths.

Statistical and Social Inquiry Society of Ireland, Journal.

Australia—

Bureau of Census and Statistics. Australian demography. Finance. Labour report. Official year book. Oversea trade. Pocket compendium of Australian statistics. Production. Quarterly summary of Australian statistics. Transport and communication.

Department of Health. Health.

Economic record.

New South Wales—

Auditor General. Report.

Bureau of Statistics. Official year book. Statesman's year book. Statistical bulletin. Statistical register.

Department of Railways. Report of the Commissioner.

Public Works Department. Report.

Queensland—

Registrar-General's Office. A B C of Queensland statistics. Agricultural production. Live stock and pastoral production. Statistics of the State of Queensland.

South Australia—

Public Library, Museum and Art Gallery. Annual report.

Statistical Office. Statesman's pocket year book. Statistical register.

Tasmania—

Bureau of Census and Statistics. Pocket year book. Statistics of the State of Tasmania.

Report on Government Railways and Ferry Service.

(b) India, Dominions, and Protectorates—*Contd.*

Victoria—

Office of the Government Statist. Victoria year book. Friendly societies, Report.
Public Library, Museum and National Gallery. Report of the Trustees.

Western Australia—

Department of Mines. Report.
Government Statistician's Department. Pocket year book. Quarterly statistical abstract. Statistical Register.
Registrar of Friendly Societies. Report of proceedings.

Canada—

Department of Agriculture. Report of the Veterinary Director General.
Department of Finance. Public accounts.
Department of Justice. Annual report of the Superintendent of Penitentiaries.
Department of Labour. Labour gazette. Prices in Canada and other countries. Wages and hours of labour.
Department of Public Works. Report of the Minister of Public Works.
Dominion Bureau of Statistics. Automobile accidents. Canada year book. Coal statistics. Education annual survey. Fisheries statistics. Iron and steel industry. Live stock and animal products statistics. Manufactures of non-ferrous metals. Mineral production. Monthly review of business statistics. Statistics of dairy factories. Statistics of steam railways. Trade of Canada. [Fiscal year, Calendar year, and Quarterly returns.] Vital statistics.
ALBERTA. *Department of Public Health.* Annual report of the Vital Statistics Branch.
ONTARIO. *Department of Agriculture.* Annual reports.
QUEBEC (PROVINCE). Statistical year book.
Bank of Nova Scotia; Monthly review.
Canadian Bank of Commerce, Commercial letter; Annual statement.
Royal Bank of Canada, Monthly letters; Annual report.

Ceylon—

Administrative reports. Blue book. Railways (Government) report. Papers laid before State Council. Vital statistics.
Ceylon economic journal.

Federated Malay States—

F.M.S. government gazette; Manual of statistics.

Jamaica—

Vital statistics.

Malaya—

Average prices, trade, exchange, currency, cost of living. Foreign imports and exports [annual]. Malayan statistics.

Mauritius—

Blue book.

New Zealand—

Census and Statistics Office. Agricultural and pastoral production. Factory production. Friendly societies and trades unions. Insurance. Justice statistics. Local authorities' handbook. Monthly abstract of statistics. New Zealand official year-book. Population and buildings. Statistics of incomes and income tax. Statistical report on Prices, Wages . . . Banking, Building societies, Commercial afforestation. Trade and shipping. Vital statistics.

(b) India, Dominions, and Protectorates—*Contd.*

New Zealand—*Contd.*

Auckland Chamber of Commerce, Journal.
Economic structure of Canterbury.
Royal Society of New Zealand, Proceedings.
Wellington Harbour Board, Accounts.

Nigeria—

Trade supplement to Nigeria gazette. [Monthly.]

Rhodesia—

Rhodesia Chamber of Mines: annual report, and monthly returns.

Uganda Protectorate—

Blue book.

Union of South Africa—

Department of Customs and Excise. Annual statement of the trade and shipping. Trade of the Union of South Africa. [Quarterly.]
Department of Mines and Industries. Annual report of the Government Mining Engineer.
Office of Census and Statistics. Census of industrial establishments. Official year book. Statistics of migration. Report on the vital statistics.
CAPE OF GOOD HOPE. Ordinances.
NATAL. Fisheries report.
Johannesburg Chamber of Commerce. Commercial year book.
South African journal of economics.
Transvaal Chamber of Mines: annual report, and monthly analysis.

Zanzibar—

Statistics of the Zanzibar Protectorate.

(c) Foreign Countries.

Argentine Republic—

Banco Central de la Republica Argentina. Annual report.
Dirección General de Estadistica. Anuario de comercio exterior. El comercio exterior.
BUENOS AIRES. Rivista de estadistica municipal.
BUENOS AIRES (PROVINCE). Bóletin de la Dirección General de Estadistica.

Revista de ciencias economicas.

Austria—

Bundesamt für Statistik. Statistische Nachrichten. Statistisches Handbuch.
Bundesministerium fur Handel und Verkehr. Jahresheft der Statistik des Aussenhandels Österreichs. Statistik des Aussenhandels Österreichs.
VIENNA. *Statistisches Amt der Stadt.* Mitteilungen aus Statistik. Statistisches Jahrbuch. Statistisches Taschenbuch.

Monatsberichte des Instituts für Konjunkturforschung.

Belgium—

Ministère de l'Agriculture. Publications de l'Office de Statistique Agricole.
Ministère des Finances. Bulletin mensuel du commerce [December issues].
Ministère de l'Industrie et du Travail. Revue du travail.
Statistique Générale. Annuaire statistique. Bulletin trimestriel. Statistique des accidents de roulage et de la circulation.
Bulletin de l'Institut des Sciences Économiques.

(c) Foreign Countries—*Contd.*

Brazil—

Departamento Nacional de Estatistica. Banking. Foreign trade of Brazil.

Departamento Nacional da Industria e Commercio. Boletim.

Directoria de Estatistica Economica e Financeiro. Estatisticas economicas.

Ministerio da Agricultura. Revista de economia e estatistica.

Ministerio do Trabalho Industria e Commercio. Boletim.

Bulgaria—

Direction Générale de la Statistique. Annuaire statistique. Bulletin mensuel de statistique. Mouvement de la population. Revue de la statistique générale. Statistique agricole. Statistique de commerce. Statistique coopérative. Statistique criminelle. Statistique de l'enseignement.

Statistical Institute for Economic Research, publications.

Chile—

Dirección General de Estadistica. Estadistica Chilena. [Monthly.]

SANTIAGO. *Junta Local de Beneficencia.* Anuario estadistico.

China—

Chinese Maritime Customs. List of lighthouses, light-vessels, etc. Monthly returns of the foreign trade. Trade of China. [Annual.]

National Tariff Commission. Index numbers of wholesale prices. Prices and price indexes in Shanghai.

Ministry of Communications. Report on the Chinese Post Office.

Nankai Institute of Economics : Nankai social and economic quarterly.

Cuba—

Seccion de Estadistica. Comercio exterior.

Czechoslovakia—

Office de Statistique. Annuaire statistique. Monthly summary of foreign trade. Rapports de l'Office de Statistique. Rapports sur les prix. Revue statistique Tchécoslovaque.

Statistique Tchécoslovaque [including annual returns on—Agriculture, Education, Trade, etc.].

PRAGUE. Annuaire statistique. Bulletin mensuel.

Denmark—

Det Statistiske Departement. Danmarks Handelsflaade og Skibsfart. Danmarks . . . Retspleje. Danmarks Vare-Ind- og Udforsel. Statistisk Aarbog. Statistiske Efterretninger.

Statistiske Meddelelser [including annual returns on—Agriculture and Live-stock, Electrical undertakings, Housing and rents, Municipal finance, Prices, Production, Taxation, etc.]. Vareomsaetning med Udlandet. [Monthly.]

COPENHAGEN. *Statistiske Kontor.* Statistisk Aarbog. Bulletin hebdomadaire de statistique démographique.

Sundhetsvæsenet, Aarsberetning.

Nationaløkonomisk Tidsskrift.

Egypt—

Département de la Statistique Générale. Annuaire statistique. Annual statement of the foreign trade. Births, deaths and infectious diseases. [Annual and weekly returns.] Monthly agricultural and economic statistics. Monthly summary of the foreign trade. Return of shipping, cargo, and passenger traffic in the Egyptian ports and Suez Canal transits. [Annual, and Quarterly.] Statistique scolaire.

Commission de la Dette Publique. Compte rendu des travaux de la Commission.

Ministry of Communications. Report of the postal savings bank service.

L'Egypte contemporaine.

(c) Foreign Countries—*Contd.*

Estonia—

Bureau Central de Statistique. Annual returns relating to: Agricultural statistics, Movement of population. Trade. Recueil mensuel du Bureau Central de Statistique.

Institute of Economic Research, Weekly bulletin. Konjunktuur.

Finland—

Bureau Central de Statistique. Annuaire statistique.

Finlands Officiella Statistik. [Annual returns relating to: Banks; Crime; Elections; Industries; Savings banks; Trade; Vital statistics.]

Ministère des Affaires Sociales. Revue sociale.

Åbo Academy. Acta Mathematica et Physica.

France—

Banque de France. Compte rendu des opérations.

Direction Générale des Douanes. Statistique mensuelle du commerce extérieur. Tableau général du commerce extérieur. Tableau général de la navigation maritime.

Ministère de l'Agriculture. Bulletin de l'Office de Renseignements Agricoles. Statistique agricole.

Ministère des Colonies. Bulletin mensuel de statistiques coloniales.

Ministère des Finances. Bulletin de statistique et de législation comparée. Renseignements statistiques relatifs aux impôts directs.

Ministère de la Justice. Compte générale de l'administration de la justice criminelle. Statistique pénitentiaire.

Ministère du Travail. Bulletin du travail.

Statistique Générale. Annuaire statistique. Bulletin de la Statistique Générale. Statistique annuelle des institutions d'assistance. Statistique des forces motrices. Statistique du mouvement de la population.

Ministère des Travaux Publics. Statistique de la navigation intérieure. Statistique de la production et de la distribution de l'énergie électrique. Statistique de l'industrie minérale. Statistique des chemins de fer (Interêt général).

PARIS. *Bureau de la Statistique Municipale.* Annuaire Statistique.

ALSACE LORRAINE. Annuaire Statistique. Comptes rendus statistiques.

L'Économiste français.

Journal des économistes.

Polybiblion.

La Quinzaine coloniale.

Revue d'économie politique.

Journal de la Société de Statistique de Paris.

Germany—

Reichsarbeitsministerium. Amtliche Nachrichten für Reichsversicherung. Reichsarbeitsblatt.

Reichsgesundheitsamt. Reichs-Gesundheitsblatt.

Statistisches Reichsamt. Monatliche Nachweise über den auswärtigen Handel Deutschlands.

Statistik des Deutschen Reichs [including annual reports on—Consumption of excisable articles, Crime, Movement of Population, Railway traffic (goods), Sickness insurance, Trade and Navigation, etc.]. Statistisches Jahrbuch für das Deutsche Reich. Vierteljahrshefte zur Statistik. Wirtschaft und Statistik.

BERLIN. *Statistisches Amt.* Monatsbericht.

FRANKFORT. *Statistisches Amt.* Beiträge zur Statistik.

Allgemeines Statistisches Archiv.

Archiv für mathematische Wirtschaft und Sozialforschung.

Bulletin of the Hamburg World Economic Archives.

Die Bank.

Deutsche Volkswirt.

(c) Foreign Countries—*Contd.*

Germany—*Contd.*

Deutsches Statistisches Zentralblatt.
Institut für Konjunkturforschung: Vierteljahrsheft; Weekly Report, Wochenbericht.
Statistisches Jahrbuch deutscher Gemeinden.
Weltwirtschaftliches Archiv.
Wirtschaftsdienst.
Zeitschrift für die gesamte Versicherungs-Wissenschaft.

Greece—

Statistique Générale. Annuaire statistique. Bulletin mensuel de statistique. Bulletin mensuel du commerce. Statistique du commerce.
Commission Financière Internationale. Compte rendu des opérations.

Hungary—

Office Central Royal Hongrois de Statistique. Annuaire statistique hongrois. Bulletin statistique trimestriel.
Publications statistiques hongroises [including annual reports on—Education, Movement of Population, Trade, etc.].
Revue hongroise de statistique.
BUDAPEST. *Kommunalstatistisches Amt.* Monatshefte. Statistisch-Administratives Jahrbuch.
Journal de la Société Hongroise de Statistique.
Matematikai és fizikai lapok.

Iceland—

Bureau de Statistique. Annuaire statistique. Statistical bulletin. Statistique de commerce. Statistique de la pêche.

Italy—

Istituto Centrale di Statistica. Annali di statistica. Annuario statistico italiano. Bollettino mensile di statistica. Bollettino mensile di statistica agraria e forestale. Compendio statistico italiano. Movimento della popolazione. Statistica delle cause di morte.

Direzione Generale delle Dogane e Imposte Indirette. Movimento commerciale del Regno. Movimento della navigazione. Statistica delle imposte di fabbricazione.
Ministero dell Agricoltura e delle Foreste. Annali della sperimentazione agraria Bollettino delle Casse di Risparmio ordinarie e dei monti di pietà di 1ª categoria. Bollettino dei monti di pietà di 2ª categoria. Nuovi annali dell'agricoltura.
Annali di economia.
Assicurazioni Sociali.
Assistenza Sociale.
Barometro economico.
Economia.
Giornale degli economisti.
Giornale di matematica finanziaria.
Metron.
Organizzazione industriale.
Prospettive economiche. (*G. Mortara.*)
Rivista di storia economica.

Japan—

Bureau de la Statistique Générale. Mouvement de la population. Résumé statistique de l'Empire du Japon.
Department of Finance. Financial and economic annual of Japan.
Ministry of Agriculture and Forestry. Statistical abstract.
TOKYO. Statistical abstract.

Kyoto University, Economic review.
Oriental economist.
Report on progress in Manchuria.

(c) Foreign Countries—*Contd.*

Latvia—

Bureau de statistique. Bulletin mensuel.
RIGA. Statistical Year-book.

Luxemburg, Grand Duchy—

Office de Statistique. Aperçu Statistique. Bulletin trimestriel.

Mexico—

Departamento de la Estadística Nacional. Anuario. Comercio exterior y navigación. Rivista de economia y estadística.
Boletin de la Sociedad Mexicana de Geografia y Estadística.

Morocco—

Bulletin économique de Maroc.

Mozambique—

Repartição de Estatística. Anuario estatistico. Annual returns relating to: Education, Financial Statistics, Health Report, Trade, Postal and Telegraph Service. Bulletin économique et statistique.

Netherlands—

Centraal Bureau voor de Statistiek. Crimineele statistiek, Gevangenisstatistiek, Statistiek van de toepassing der kinderwetten. Jaarcijfers voor Nederland. Jaarstatistiek van den in, uit- en doorvoer. Justitieele statistiek en Faillissementsstatistiek. Maandcijfers betreffende de bevolking van Nederland. Maandstatistiek van den in-, uit-, en doorvoer. Statistiek van de scheepvaart op het buitenland. Nederlandsche Conjunctuur. Maandschrift van het Centraal Bureau voor de Statistiek.
AMSTERDAM. *Bureau de Statistique.* Annuaire statistique. Bulletin mensuel.

Netherlands East Indies—

Centraal Kantoor voor de Statistiek. Exports of crops. Education statistics. Statistical abstract.

Norway—

Committee for Whaling Statistics. International whaling statistics.
Det Statistiske Centralbyrå. Manedsopgaver over vareomsetningen med utlandet.
Norges Offisielle Statistik [including annual reports on—Agriculture and Live-stock, Assurance, Crime, Finance, Fisheries, Industrial Production, Mineral industry, Milk industry, Postal and Telegraph services, Public Health, Railways, Trade, Veterinary Service, etc.].
Statistisk årbok. Statistiske meddelelser.
OSLO. Årsberetning. Beretning fra Oslo helseråd. Statistisk årbog. Statistisk manedskrift.

Peru—

Departamento de Estadistica General de Aduanas. Boletin mensual del comercio especial. Anuario del comercio exterior. Extracto estadistica.
Banco Central de Reserva, Boletin.

Philippine Islands—

The Philippines statistical review.

Poland—

Office de Statistique. Annuaire statistique. Commerce extérieur. [Monthly.] Informations statistiques. Concise statistical year-book. Petit annuaire statistique. Revue trimestrielle de statistique.
Statistique de la Pologne [including annual returns relating to—Agriculture, Postal Service, Trade, etc.].

(c) **Foreign Countries**—*Contd.*

Poland—*Contd.*

Office de Statistique (contd.). Statistique des prix. Statistique du travail.
LODZ. Annuaire statistique.
Baltic Countries. Ekonomika.
Polish Institute for Economic Research: Monthly statistical tables.

Portugal—

Direcção Geral de Estatistica. Anuario estatistico. Bulletin mensuel de statistique. Estatistica comercial.

Rumania—

Caisse Autonome des Monopoles. Bulletin.
Institut de Statistique Générale. Annuaire Statistique. Bulletin de Statistique. Commerce extérieur de la Roumanie. Annual returns relating to—Agriculture and Live-stock, Joint-Stock Companies, Mineral Statistics, Prices, Trade Returns.

Russia—

Chief Customs Directorate. Statistical review of the foreign trade. [Monthly.]
Russkyt Ekonomichesky Svornik (Russian Economic Journal: published by Prof. Prokopovich's Economic Committee, at Prague).

Siam—

Statistical Year-book.

Spain—

Dirección General de Aduanas. Estadistica del comercio exterior. [Annual.] Resumen mensual de estadistica del comercio exterior.
Dirección General de Agricultura. Anuario estadistico de las producciones agricolas.
Instituto Geografico Catastral y Estadistica. Anuario estadistico. Boletin del Centro de Investigaciones Especiales o Laboratorio de Estadistica. Movimento de la poblacion. Pasajeros por mar.
MADRID. Boletin del Ayuntamiento.

Sweden—

Kommerskollegium. Kommersiella meddelanden.
Riksgäldskontoret. Svenska statens tillgångar och schulder.
Statistiska Centralbyrån. Järnvägsstatistiska meddelanden. Månadsstatistik över handeln. Sociala meddelanden.
Sveriges officiella statistik [including annual returns relating to—Agriculture and Live-stock, Assurance, Banking, Co-operative Societies, Crime, Excise, Finance (State and Municipal), Fisheries, Forests, Industry, Labour and wages, Lunacy, Mines, Pensions, Poor relief, Population, Postal services, Public Health, Health of Army and Navy, Railways, Savings Banks, Trade and Shipping, Veterinary service, Water-power, etc.].
Statistisk årsbok. Uppgifter om bankerna.
Sveriges Riksbank. Årsbok.
STOCKHOLM. *Statistiska Kontor.* Statistisk årsbok.
Economisk Tidskrift.
Skandinaviska Kreditaktiebolaget, Quarterly report.
Svenska Handelsbanken, Index.
Swedish economic review.

Switzerland—

Bureau Fédéral des Assurances. Les entreprises d'assurances privées.
Bureau Fédéral de Statistique. Annuaire statistique.
Statistiques de la Suisse [including annual returns relating to: Agricultural Statistics, Assurance Societies, Crime, Finance, Forestry, Live-stock, Vital Statistics].
Département Fédéral de l'Economic Publique. La vie economique. Die volkswirtschaft.

(c) Foreign Countries—*Contd.*

Switzerland—*Contd.*

Direction Générale des Douanes Fédérales. Statistique annuelle du commerce exterieur. Statistique mensuelle du commerce exterieur. Rapport annuel.

ZURICH. Statistisches Jahrbuch. Zürcher statistische Nachrichten.

Journal de statistique et revue économique suisse.

Rapport sur le commerce et l'industrie de la Suisse.

Société de Banque Suisse, Bulletin mensuel.

Turkey—

Direction Générale des Douanes. Statistique annuelle du Commerce de la Turquie.

Office Central de Statistique. Annuaire statistique.

United States—

Agriculture, Department of. Agricultural statistics. Crops and markets. Year-book.

Central Statistical Board. Annual Report.

Census, Bureau of the. Birth statistics. Cotton production. Cotton production and distribution. Financial statistics of cities. Financial statistics of states. Marriage and divorce. Mortality statistics. Vital statistics—special reports.

Children's Bureau. Annual reports. Bulletins.

Currency, Comptroller of the. Annual report.

Education, Office of. Biennial survey of education. Bulletin. School life.

Federal Reserve Board. Annual report. Federal Reserve bulletin.

Foreign and Domestic Commerce, Bureau of. Commerce reports. [Weekly.] Foreign commerce and navigation for the calendar year. Monthly summary of the foreign commerce of the United States. Statistical abstract. Survey of current business.

Federal Trade Commission. Annual report.

Internal Revenue, Bureau of. Annual report of the Commissioner. Statistics of income.

Interstate Commerce Commission. Statistics of railways in the United States.

Labor Statistics, Bureau. Bulletins. Monthly labor review.

Library of Congress. Report of the Librarian.

Mines, Bureau of. Minerals year-book.

Navigation, Bureau of. Merchant marine statistics.

Panama Canal, Office of the. Annual report of the Governor. Panama Canal record.

Public Health Service. Public health reports.

Treasury. Annual report of the Secretary, with appendices. Annual report of the Director of the Mint. Circulation statement. Statement of public debt.

Women's Bureau. Bulletins.

CALIFORNIA. Department of Industrial Relations, Report. Division of Fish and Game, Fish Bulletins.

CONNECTICUT. Health reports. Registration report. Health bulletin.

MARYLAND. Annual report of State Board of Health.

MASSACHUSETTS. Conciliation and Arbitration Report. Annual report of Dept. of Labor and Industries.

NEW YORK STATE. Department of Labor, Special Bulletins. Industrial Bulletin. Industrial Commissioner, Report of State Department of Health: annual report, monthly vital statistics review. State Tax Commission Report.

CHICAGO. Board of Trade Report.

NEW YORK CITY. Public Library Bulletins.

Actuarial Society of America, Transactions. American Academy of Political and Social Science, Annals. American Bureau of Metal Statistics, Yearbook. American economic review. American Institute of Actuaries, Record. American Iron and Steel Institute, Report. American Petroleum Institute, Bulletin. American Philosophical Society, Proceedings. American Statistical Association, Annals of mathematical statistics: Journal.

(c) Foreign Countries—*Contd.*

United States—*Contd.*

Commercial and Financial Chronicle.
Econometrica.
Harvard Business Review. Harvard Economic Society: Review of Economic Statistics.
Illinois University Bur. of Business Research, Bulletins. International Conciliation.
Johns Hopkins University School of Hygiene, Collected Papers. Journal of political economy.
Milbank Memorial Fund, Reports. Mineral industry.
Quarterly journal of economics.
Smithsonian Institution. Various publications. Social Research. Stanford University Food Research Institute: Wheat studies.

Uruguay—

Direccion General de Estadistica. Anuario estadistico (in parts). Sintesis estadistica.

Yugoslavia—

Statistique Générale d'État. Annuaire statistique. Statistique du commerce extérieur.

(d) International.

League of Nations—

Official journal.
Economic and Financial Section. Balances of payments. Commercial banks. International trade statistics. Monthly bulletin of statistics. Review of world trade. Statistical year-book of the League of Nations. World economic survey. World production and prices.
Health Organization. Monthly epidemiological report. Statistics of notifiable diseases.

International Institute of Agriculture—

Agricultural situation. International review of agriculture. Int. year-book of agricultural statistics. Int. year-book of agricultural legislation. International year-book of forestry statistics.

International Labour Office—

I.L.O. Year-book. International labour review. Studies and reports.

International Statistical Institute—

Revue de l'Institut International de Statistique [quarterly].

Also: Bank for International Settlements, Reports; Bulletin international des douanes; Bulletin du Bureau International de Statistique Commerciale.

INDEX TO VOL. C.

YEAR 1937

(Statistical and Current Notes are indicated by the letters S.N. and C.N., respectively.)

PAGE

ADDITIONS to the Library 162, 346, 487, 702
AGRICULTURAL Economics Society. Prize Essays. (C.N.) . . 147, 339
——— Labour Bill. *See* THOMPSON (R. J.).
——— labourers, wages of. (S.N.) 135
——— Marketing Schemes. (S.N.) 134
——— output of England and Wales. *See* THOMPSON (R. J.).
AGRICULTURE. Crops grown under glass in England and Wales, estimated output (S.N.) 327
ANNUAL General Meeting. Report of the Council. . . . 642

BANK of England weekly returns during 1936 179
BANKRUPTCIES. Statistics relating to. (C.N.) 145
BOOKS. *Reviews of statistical and economic books:*
  Agricultural statistics for England and Wales, part i. (S.N.) . . 468
  Angas (L. L. B.). Investment for appreciation 307
  Bank of England. Bank of England reference library catalogue. (C.N.) . 479
  Blacker (C. P.) and Glass (D. V.). Future of our population. (C.N.) . 477
  Blodgett (R. H.). Cyclical fluctuations in commodity stocks . . 114
  Board of Trade. Report on the Import Duties Act Inquiry, part i . 324
  Boyd (E.). Growth of the surface area of the human body . . . 111
  British National Committee of the International Chamber of Commerce. Trial census of distribution in six towns 674
  Burrows (R.). Problems and practice of economic planning . . 675
  Burton (C.). Concise manual of statistics 448
  Carr-Saunders (A. M.). World population: past growth and present trends 639
  Clare (G.) and Crump (N.). ABC of the foreign exchanges . . . 307
  Clark (C.). National income and outlay 665
  Daniels (G. W.) and Campion (H.). Distribution of national capital . 668
  Davenport (C. B.) and Ekas (M. P.). Statistical methods in biology, medicine and psychology 110
  Einzig (P.). Theory of forward exchange 410
  Elsas (M. J.). Umriss einer Geschichte der Preise und Lohne in Deutschland 455
  Fisher (R. A.). Statistical methods for research workers. (C.N.) . . 476
  Fritz (W. G.) and Veenstra (T. A.). Regional shifts in the bituminous coal industry 663
  Goodrich (C.) and others. Migration and economic opportunity . . 660
  Greenwood (M.) and others. Experimental epidemiology . . . 103
  Haberler (G. von). Prosperity and depression 671
  Harrison (H.), Mitchell (F. C.), and others. The home market . 115
  Harrod (R. F.). The trade cycle 438
  Hartog (Sir P.) and Rhodes (E. C.). Marks of examiners . . . 106
  Hawtrey (R. G.). Capital and employment 439
  Hays (S.). An outline of statistics 658
  Hill (Dr. Bradford). Investigation into the sickness experience of London Transport Workers. (C.N.) 476
  —— Principles of Medical Statistics 657
  Holmes (R. L. A.). Statistics for professional students . . . 418
  Import Duties Advisory Committee on the Iron and Steel Industry. Report 433
  Incorporated Society of British Advertisers. Readership of newspapers and periodicals of Great Britain. (C.N.) 479
  Inouye (Masaji). Population of Japan. (S.N.) 695
  Institute for the Research of Population Problems in Japan. History of the Institute. (S.N.) 694
  Institut fur Konjunkturforschung. Energiequellen der Welt. (S.N.) . 474
  International Institute of Agriculture. October Crop Bulletin. (S.N.) . 143

BOOKS. *Reviews of statistical and economic books* (contd.).

PAGE

International Institute of Agriculture. International Year Book of Agricultural Statistics for 1935–36 and 1936–37. (S.N.) 471
—— Institute of Agriculture. World agricultural situation in 1934–35 310
—— Labour Office. Maritime statistical handbook 436
Johnson (E. A. J.). Predecessors of Adam Smith 678
Jones (D. Caradog). Trade revival in a Depressed Area 417
Knight (A. W.). Abolish slumps, a diagnosis of the trade cycle 306
Kuczynski (J.). Labour conditions in Western Europe 309
Lejeune (J.). Les méthodes de construction des index-numbers 113
Levy (H.) and Roth (L.). Elements of probability 299
London University. Statistical Research Memoirs, vol. i. (C.N.) 144
Lucas (A. F.). Industrial reconstruction and the control of competition 443
Macfie (A. L.). Essay on economy and value 122
Macgregor (D. H.). Industrial combination, re-issue. (C.N.) 141
Marbe (K.). Grundfragen der angewandten Wahrscheinlichkeitsrechnung und theoretischen Statistik 112
Meade (J. E.). Introduction to economic analysis and policy 302
Milk. Report of the Reorganizing Commission for Great Britain 116
Milnes (N.). Study of industrial Edinburgh 118
Ministry of Agriculture. Agricultural Statistics, part i, 1935. (S.N.) 131
Neisser (H.). Some international aspects of the business cycle 673
Paradoxes inédits du Seigneur de Malestroit touchant les Monnoyes 317
Pigou (A. C.). Economics of stationary States 303
Porteous (D. A.). Pension and widows' and orphans' funds 451
Rather (A. W.). Planning under capitalism 675
Registrar-General. Statistical Review. (S.N.) 333
Riley (G. S.). Building Society practice 311
Rist (C.) and others. L'Enseignement économique en France et à l'étranger 155
Robbins (L.). Economic planning and international order 675
Robinson (Joan). Essays in the theory of employment 669
Rountree (G. M.). The railway worker 450
Rowse (A. L.). Mr. Keynes and the Labour Movement 123
Sarkar (B. K.). Indian currency and Reserve Bank problems 121
Sasuly (M.). Trend analysis of statistics 112
Say (J. B.). Letters to Malthus 315
Sayers (R. S.). Bank of England operations 1890–1914 415
Shaffner (F. I.). Problem of investment 415
Shirras (G. F.). Science of public finance (3rd. ed.) 120
Smith (W. M.). Marketing of Australian and New Zealand primary products 312
Stamp (Sir J.). Fundamental principles of taxation 300
Stewart (W. D.). Mines, machines and men 313
Thomas (B.). Monetary policy and crises 301
Wheldon (H. J.). Business statistics and statistical method 448
Wickwar (W. H.). The social services 315
Wilzin (L.). Musikstatistik 453

Other new publications (shorter notices):

Brunner (E. de S.) and Lorge (I.) Rural trends in depression years 457
De Kock (M. H.). Economic development of South Africa 124
Gurtner (J.). Die katholische Kirchenmusik Österreichs im Lichte der Zahlen 457
Hamilton (G.). Social case recording 458
Hoffman (F. L.). Cancer and diet 458
Holford (W. G.) and Eden (W. A.). Future of Merseyside 458
Institute of Actuaries and Faculty of Actuaries. Continuous investigation into mortality of assured lives 319
Istituto Centrale di Statistica. Decennale 1926 320
Jaroslav (J.). Základy statistické indukce 458
Johns Hopkins University. Collected papers from the Department of Biology of the School of Hygiene and Public Health 320
Lee Chou-Ying. System of Chinese public finance 125
Marshall (A. H.). Local Authorities: internal financial control 321
Morton (N. W.). Individual diagnosis 680
Owen (L. A.). Russian peasant movement, 1906–1917 459
Pabst (W. R.). Butter and oleomargarine 459
Pittsburgh, University of. Real property, inventory of Allegheny County 459
Rose (T. G.). Business charts (3rd ed.) 681
Rubinow (I. M.). Some statistical aspects of marriage and divorce 125
Savorgnan (F.). Corso di demografia 681
Shields (B. F.). Labour contract 126
Swan (J. P.). Vaccination problem 321
Tenderini (D.). Analisi sui prezzi in Italia, 1901–1932 681
Wyatt (T. W.). Money and the machine age 681

BOWLEY (A. L.). Twenty-third session of the International Institute of Statistics, 1936 100
BRESCIANI-TURRONI (C.) On Pareto's Law 421
BROSTER (E. J.). Simple method of deriving demand curves 625

I. A. R. I. 75.

INDIAN AGRICULTURAL RESEARCH
INSTITUTE LIBRARY,
NEW DELHI.

Date of issue.	Date of issue.	Date of issue.

MGIPC—S5—38 AR/54—7-7-54—7,000.